W.P.

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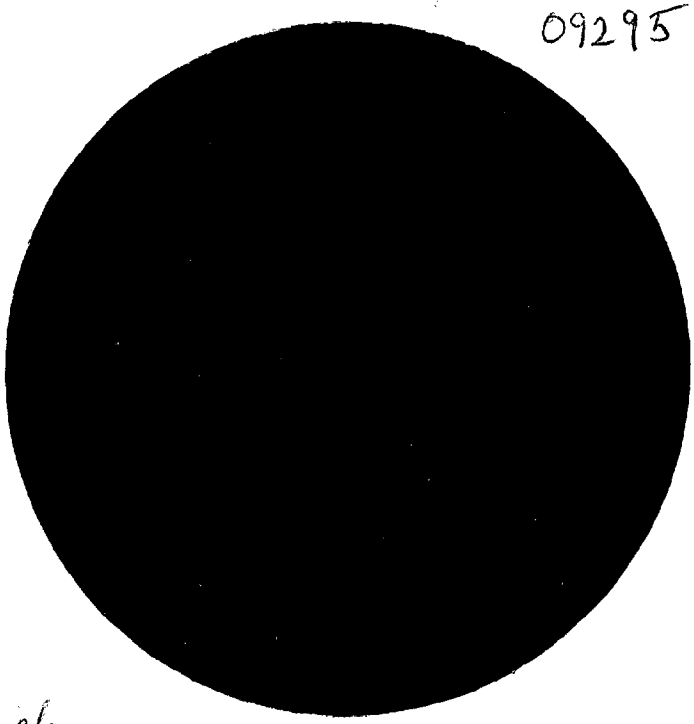

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COASTAL ZONE MANAGEMENT PROGRAM

Indiana State Planning Services Agency

Indiana State Planning Services Agency · Lt. Governor Robert D. Orr, Director · 143 West Market Street, Indianapolis, Indiana 46204

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Economic and Social
Inventory
Technical Report 102
Part 2

Economic and Social Inventory
Technical Report 102
Part 2

September 30, 1976

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III.5 PHYSICAL DATA ACQUISITION - WATER QUALITY

The purpose of this section is to review existing water quality data and to identify existing and potential sources of water pollution as a basis for making future land-use decisions. The existing water quality data for the CZM area consists of both chemical and physical samples and tests taken on two bodies of water and at several waste treatment facilities (public and private) within the Michigan City area.

Existing Water Quality Data

There are a number of water bodies located within the CZM area: Round Lake, Walton Lake, Lee Lake, Hildebrand Lake, Ohm's Lake, Browdy Lake, Dingler Lake, Spychalskis Pond, Little Calumet River, Wolf Run, Reynolds Creek, Waterford Creek and, of course, Lake Michigan. Unfortunately, water quality data only exist for Trail Creek and Lake Michigan. Data for Trail Creek were obtained by the State of Indiana, Stream Pollution Control Board and the U. S. Environmental Protection Agency. Data for Lake Michigan were obtained by the U.S. E.P.A. Data were obtained from the U.S. E.P.A. through STORET (water quality data storage and retrieval computer file developed by the U.S. E.P.A. This file stores and retrieves ambient water quality and some effluent data).

Table 1 presents data obtained for trail Creek by the Stream Pollution Control Board. Twenty-five stations were sampled for various parameters in July, 1973. Violations of the Stream Pollution Control Board Regulation SPC-3 (water quality standards for waters of Indiana) were noted for eleven stations in terms of dissolved oxygen, 5-day biochemical oxygen demand and fecal coliform bacteria. This particular sampling was used to classify Trail Creek as a Water Quality Limited Segment (water segments where it is known that water quality does not meet applicable water quality standards and which is not expected to meet these standards even after application of effluent limitations). Erratic flow patterns, bottom sediment characteristics, Michigan City waste treatment plant, industrial waste discharges, and periodic sewer overflows were cited as some of the major causes for the poor water quality in Trail Creek (Michiana Area Council of Governments, 1975, Sect. 208 Areawide Waste Treatment Management Planning: Area and Agency Designation).

More recent (1974, 1975) water quality data are presented in Tables 2 and 3. Again, standards were exceeded for the above mentioned parameters. As a consequence, Trail Creek has remained classified as Water Quality Limited. Collection of additional data has taken place in 1976 and is planned to be continued by the Indiana Stream Pollution Control Board. To date, this material has not been available for review.

Table 1 Water Quality Monitoring Data For Trail Creek, 1973

TABLE 1

Station Description	Survey Period	D.O Min mg/l	D.O Ave mg/l	BOD mg/l	COD mg/l	Oil mg/l	SS. mg/l	P mg/l	NH_3 mg/l	NO_3 mg/l	F mg/l	Cl mg/l	SO_4 mg/l	CN mg/l	Phenol mg/l	Temp mg/l	pH mg/l	Hg ug/l	Fe mg/l	Cu mg/l	Cd mg/l	Ni mg/l	Zn mg/l	Pb mg/l	Cr Tot mg/l	Fecal Coliform per 100 ml A. mean G. mean
TCW-1S Trail Cr. near Black Road Michigan City	7-23-73 7-24-73	7.5	8.0	2.3	22.0		52.0	0.09	0.3	0.5		12.0		0.03	0.002	19.8	7.5	0.1		.02	0.01	0.04	0.09	.02	.01	2087
TCE-1S Trail Cr. near U.S. 20-35 Michigan City	7-23-73 7-24-73	7.4	7.8	2.1	20.0		30.0	0.17	0.4	0.1		2.2		0.027	0.004	19.8	7.3	0.1		0.03	.01	0.08	0.14	0.03	.01	1290
TC-1S Trail Cr. near S.R. 212 bridge Michigan City	7-23-73 7-24-73	6.9	7.6	2.0	20.0		44.0	0.08	0.3	0.6		12.0		0.045	0.001	20.5	7.5	0.1		0.02	.01	0.05	0.09	0.02	.01	770
TC-2S Trail Cr. near U.S. 35 bridge Michigan City	7-23-73 7-24-73	7.6	8.0	2.0	24.0		48.0	0.10	0.3	0.3		21.0		0.040	0.001	20.6	7.7	0.1		.02	.01	0.03	0.07	.02	.01	640
TC-3S Trail Cr. dump pipe at Karwick & Warnke Road Michigan City	7-23-73 7-24-73			560.0	1040.0		100.0	0.50	170.0	0.1		340.0		0.030	0.050	17.0	6.8	0.6		.02	0.01	0.08	1.1	0.03	.01	2200
TC-4S Trail Cr. near Springland bridge Michigan City	7-23-73 7-24-73	6.0	7.3	3.7	26.0		48.0	0.17	0.4	0.4		17.0		0.118	0.001	20.7	7.6	0.1		0.03	0.01	0.09	0.17	0.05	.01	1680
SPC 1R-3 SPC 12 Mig. Rt. WQS-SPC 12 rearing and reprinting		4.0 6.0 7.0	5.0 6.0 7.0											.01				5	0.3	1.0						
TC-5S Trail Cr. near Liberty Trail bridge Michigan City	7-23-73 7-24-73	3.8	6.1	3.7	22.0		34.0	0.14	0.2	0.5		19.0		0.083	0.004	21.7	7.4			0.02	.01	0.05	0.14	0.05	.01	1400
TC-6S American Cyanamide & Phillips Drill final pipe at Lib. Tr. Michigan City	7-23-73 7-24-73	6.4	7.1	7.1	22.0		30.0	0.18	1.7	0.1				0.009	0.002	21.8	7.5	1.2		0.02	.01	0.05	0.23	0.15	.01	35,043
TC-7S Trail Cr. Norfolk & Western RR tracks Michigan City	9-26-73 9-27-73	7.3	7.3	2.1			31.0		0.4							20.0	7.0									

TABLE 1, cont'd

Station Description	Survey Period	D.O Min mg/l	D.O Ave mg/l	BOD mg/l	COD mg/l	Oil mg/l	SS. mg/l	P mg/l	NH_3 mg/l	NO_3 mg/l	F mg/l	Cl mg/l	SO_4 mg/l	CN mg/l	Phenol mg/l	Temp mg/l	pH mg/l	Hg ug/l	Fe mg/l	Cu mg/l	Cd mg/l	Ni mg/l	Zn mg/l	Pb mg/l	Cr Tot mg/l	Fecal Coliform per 100 ml A. mean G. mean
TC-8S Trail Cr. near RR bridge 300 ft. upstream from STP outfall Michigan City	7-23-73 7-24-73	4.6	6.2	2.8	34.0		14.0	0.14	0.3	0.5		18.0		0338	0.003	21.4	7.7			.02	.01	0.05	0.09	0.06	.01	195,080
TC-9T Michigan City STP final effluent Michigan City	7-23-73 7-24-73 9-26-73 9-27-73	4.3	4.8	22.0 3.8	40.0		18.0 2.0	0.80	9.0 10.0	1.2		6.0		.040	.021	21.0	7.3 6.6	0.1		.02	.01	0.06	0.43	0.02	.01	44,667
TC-10S Trail Cr. near 40 ft. downstream from SPT outfall Michigan City	7-23-73 7-24-73	4.5	5.6	3.5	34.0		8.0	0.28	1.2	0.4		24.0		0.073	0.004	22.8	7.8			0.02	.01	0.05	0.19	0.08	.01	169
TC-11S Trail Cr. E St. bridge Michigan City	9-26-73 9-27-73	6.7	6.7	1.7			8.0		2.4							21.0	7.0									
TC-11S Trail Cr. near E. St. bridge Michigan City	7-23-73 7-24-73	4.3	5.8	5.8	30.0		16.0	0.26	2.0	0.4		27.0		0.040	0.005	21.8	7.6			0.02	.01	0.01	0.21	0.04	.01	110,030
TC-12S Trail Cr. near 6th St. bridge Michigan City	7-23-73 7-24-73	2.5	5.4	4.0	22.0		20.0	0.30	2.0	0.4		27.0		0.00	0.003	21.9	7.4			.02	.01	0.02	0.14	0.03	.01	19,937
TC 13A (S) Trail Cr. 4th St. turning basin surface sample Michigan City	7-23-73 7-24-73	3.8	5.0	6.3	25.0		16.0	0.40	2.1	0.4		27.0		0.03	0.003	21.9	7.8			.02	.01	0.02	0.14	0.03	.01	19,937
TC 13B (S) Trail Cr. 4th St. turning basin bottom sample Michigan City	7-23-73 7-24-73	3.9	5.7	7.3	35.0		66.0	0.32	1.9	0.4		27.0		0.143	0.003	20.7	7.4			0.02	.01	0.04	0.28	0.06	.01	54,233
TC 14A (S) Trail Cr. 2nd St. bridge surface sample Michigan City	7-23-73 7-24-73	3.7	5.2	5.8	38.0		22.0	0.22	1.7	0.4		25.0		0.027	0.004	21.2	7.3			.02	.01	0.04	0.13	0.08	.01	65,677

TABLE 1, cont'd

Station Description	Survey Period	D.O Min mg/l	D.O Ave mg/l	BOD mg/l	COD mg/l	Oil mg/l	SS. mg/l	P mg/l	NH_3 mg/l	NO_3 mg/l	F mg/l	Cl mg/l	SO_4 mg/l	CN mg/l	Phenol mg/l	Temp mg/l	pH mg/l	Hg ug/l	Fe mg/l	Cu mg/l	Cd mg/l	Ni mg/l	Zn mg/l	Pb mg/l	Cr Tot mg/l	Fecal Coliform per 100 ml A. mean G. mean
TC 14B (S) Trail Cr. 2nd St. bridge bottom sample Michigan City	7-23-73 7-24-73	4.0	6.3	5.3	31.0		64.0	0.38	1.4	0.3		20.0		0.016	0.003	18.8	7.2			0.02	.01	0.04	0.26	0.07	.01	39,033
TC 15A (S) Trail Cr. near water plant surface sample Michigan City	7-23-73 7-24-73	4.6	5.6	4.0	30.0		18.0	0.31	1.7	0.4		23.0		0.027	0.003	20.9	7.5			.02	.01	0.02	0.13	0.06	.01	95,683
TC 15B (S) Trail Cr. near water plant bottom sample Michigan City	7-23-73 7-24-73	4.5	7.3	3.6	53.0		24.0	0.26	0.6	0.3		15.0		0.053	0.008	15.2	7.4			.02	.01	.02	0.22	0.06	.01	803,697
TC 16A (S) Trail Cr. near Franklin St. surface sample Michigan City	7-23-73 7-24-73	4.5	5.6	3.6	28.0		15.0	0.19	1.7	0.4		24.0		0.083	0.003	19.5	7.3			0.04	.01	0.08	0.21	0.07	.01	90,013
TC 16B (S) Trail Cr. near Franklin St. bottom sample Michigan City	7-23-73 7-24-73	6.5	8.3	1.3	20.0		20.0	0.12	0.4	0.1		12.0		0.035	0.003	12.3	7.2			.02	.01	.02	0.16	0.03	.10	2813
TC 17A (S) Trail Cr. near Coast Guard St. surface sample Michigan City	7-23-73 7-24-73	4.3	7.2	2.7	17.0		8.0	0.11	1.1	0.3		17.0		0.091	0.004	17.6	7.4			0.06	.01	0.13	0.18	0.09	.01	25,673
TC 17B (S) Trail Cr. near Coast Guard St. bottom sample Michigan City	7-23-73 7-24-73	6.6	8.1	1.6	17.0		12.0	0.12	0.5	0.2		13.0		0.036	0.003	12.8	7.4			.02	.01	0.02	0.14	0.02	.01	4370
SPC 4B Open Water		80%	90%					.03	.02		1.0	10.	26.	.01	.001			.005	.15		.01			.05		
LM-MM Lake Michigan Raw water intake Michigan City	1-18-73 12-12-73																									

SOURCE: Indiana Stream Pollution Control Board

Table 2. STATION TC .3

TRAIL CREEK - FRANKLIN STREET BRIDGE, MICHIGAN CITY, 1974

SAMPLING DATE	ALKALINITY	AMMONIA	ARSENIC	BOD	BARIUM	COD	CADMIUM	CHLORIDES	CHROME HEX	CHROME TOTAL	COLIFORM FECAL	COLIFORM TOTAL	COPPER	CYANIDE
		(MG/L)									(NUMBER/100ML)		(MG/L)	
01/16/74		.50	.010-	1.0-		6	.0100-	25	.010-	.01-	230		.02?-	.011
02/20/74		.20	.010-	1.4		4	.0100-	14	.010-	.01-	20		.02?-	.005
03/13/74		.80	.010-	2.1		14	.0100-	21	.010-	.01-	200		.020-	.006
04/17/74		.70	.010-	1.6		19	.0100-	24	.010-	.01-	910		.020-	.001
05/15/74		.40	.010-	3.6		21	.0100-	18	.010-	.01-	2100		.040	.006
06/26/74		.60	.010-	1.3		24	.0100-	18	.010-	.01-	540		.020-	.021
07/24/74		1.80	.010-	2.0		32	.0100-	23	.010-	.01-	1900		.02?-	.025
08/21/74		1.30	.010-	1.9		23	.0100-	21	.010-	.01-	100		.02?-	.009
09/18/74		.50	.010-	1.9		12	.0100-	14	.010-	.01-	520		.020-	.021
10/23/74		.20	.010-	3.1		8	.0100-	9	.010-	.01-			.020-	.005
11/20/74		.60	.010-	1.6		10	.0100-	12	.010-	.01-	80		.020-	.050
12/18/74		.40	.010-	2.4		10	.0100-	16	.010-	.01-	180		.020-	.105
MINIMUM		.20	.010	1.0		4	.0100	9	.010	.01	20		.02?-	.001
MAXIMUM		1.80	.010	3.6		32	.0100	25	.010	.01	2100		.040	.105
AVERAGE		.67	.010	2.0		15	.0100	18	.010	.01	616		.022	.022
GEO.MEAN		.55	.010	1.9		13	.0100	17	.010	.01	293		.021	.012
MEDIAN		.55	.010-	1.9		13	.0100-	18	.010-	.01-	230		.020-	.010

SAMPLING DATE	DO FIELD	FLUORIDE	HARDNESS	IRON	LEAD	MANGANESE	MERCURY	NICKEL	NITRATES	NITROGEN	THRESHOLD ODORS	OIL GREASE	PCB	PH FIELD	PH LAB
			(MG/L)				(PPB)		(MG/L)			(MG/L)	(PPB)		
01/16/74	12.5	.2		.6	.020-	.120	.200	.020	.5	.3	1.0-	3.4		8.1	7.8
02/20/74	12.3	.2		.2	.020-	.040	.100-	.020-	.3	.1-	2.0	6.4		8.3	7.9
03/13/74	11.4	.1		.6	.020-	.070	.100-	.020	.8	.1	1.0	4.9		8.1	7.2
04/17/74	9.0	.2		.7	.020	.110	.100	.040	1.1	.1	2.0	4.8		8.0	7.5
05/15/74	6.4	.3		1.6	.080	.130	.100-	.040	.5	.6	1.0	1.8		8.1	7.3
06/26/74	7.6	.3		.6	.020	.100	.100	.030	.5	.2	1.0	3.0		7.9	7.6
07/24/74	4.7	.3		.9	.020-	.120	.300	.030	.4	.1	1.0	10.2		7.5	7.4
08/21/74	7.2	1.0		.4	.040	.060	.100-	.020	.3	.1-	1.0	2.2		8.1	7.6
09/18/74	8.2	.3		.2	.020-	.040	.100	.020-	.3	.3	4.0	3.3		7.8	7.4
10/23/74	10.2	.4		.2	.030	.020	.200	.020-	.2	.3	1.0	2.5		8.5	8.2
11/20/74	10.5	.3		.3	.020	.060	.400	.020-	.3	.2	1.0	1.0-			7.7
12/18/74	12.3	1.3		.6	.040	.070	.100	.020	.4	.4	1.0	1.0-			8.4
MINIMUM	4.7	.1		.2	.020	.020	.100	.020	.2	.1	1.0	1.0		7.5	7.2
MAXIMUM	12.5	1.3		1.6	.080	.130	.400	.040	1.1	.6	4.0	10.2		8.5	8.4
AVERAGE	9.5	.4		.6	.029	.078	.158	.025	.5	.2	1.4	3.7		8.0	7.7
GEO.MEAN	9.2	.3		.5	.026	.069	.136	.024	.4	.2	1.3	3.0		8.0	7.7
MEDIAN	9.6	.3		.6	.020	.070	.100	.020-	.4	.2	1.0	3.1		8.1	7.6

NOTE: PARAMETER VALUES WITH A (-) SIGN FOLLOWING THE NUMBER INDICATES THAT THE OBSERVED VALUE WAS LESS THAN THE NUMBER INDICATED

Table 2. (Cont'd) STATION TC .3

TRAIL CREEK - FRANKLIN STREET BRIDGE, MICHIGAN CITY, 1974

SAMPLING DATE	PHENOL	PHOS-PHORUS	PHTHA-LATES	POTAS-IUM	SELENIUM	SODIUM	SOLIDS SUSP.	SOLIDS VOL.	SOLIDS TOTAL	SPEC.COND (MICRO-MHO/CM)	SUL-FATES	TEMP. FIELD	TUR-BIDITY	ZINC	FLOW
	(MG/L)		(FFB)	(MG/L)								DEG C		(MG/L)	(CFS)
01/16/74	.001	.06		2.0		19.0	15	5		440	46.0	1		.100	
02/20/74	.002	.03		2.0		9.0	13	9		360	26.0	1		.080	
03/13/74	.002	.07		3.0		15.0	25	11		510	62.0	5		.100	
04/17/74	.001-	.15		3.0		17.0	15	2		310	64.0	11		.140	
05/15/74	.002	.17		3.0		13.0	46	14		390	50.0	14		.170	
06/26/74	.001-	.13		4.0		14.0	10	3		460	54.0	17		.150	
07/24/74	.001	.17		4.0		17.0	8	5		480	53.0	20		.200	
08/21/74	.007	.08		3.0		12.0	17	3		400	26.0	22		.090	
09/18/74	.005	.06		2.0		9.0	10	1-		330	22.0	18		.200	
10/23/74	.004	.03-		2.0		7.0	2	1		320	25.0	11		.040	
11/20/74	.004	.03-		3.0		9.0	6	1-		370	40.0	6		.030	
12/18/74	.004	.07		2.0		10.0	25	2		400	40.0	2		.040	
MINIMUM	.001	.03		2.0		7.0	2	1		310	22.0	1		.030	
MAXIMUM	.007	.17		4.0		19.0	46	14		510	64.0	22		.200	
AVERAGE	.003	.09		2.7		12.6	16	5		397	42.5	11		.112	
GEO.MEAN	.002	.07		2.7		12.0	12	3		393	40.0	7		.094	
MEDIAN	.002	.07		3.0		12.5	14	3		395	43.0	11		.100	

NOTE: PARAMETER VALUES WITH A (-) SIGN FOLLOWING THE NUMBER INDICATES THAT THE OBSERVED VALUE WAS LESS THAN THE NUMBER INDICATED

Source: Indiana Stream Pollution Control Board

Table 2. (Cont'd) STATION TC 1.3

TRAIL CREEK - WALKER STREET BRIDGE, MICHIGAN CITY, 1974

SAMPLING DATE	ALKALINITY	AMMONIA	ARSENIC	BOD	BARIUM	COD	CADMIUM	CHLORIDES	CHROME HEX	CHROME TOTAL	COLIFORM FECAL	COLIFORM TOTAL	COPPER	CYANIDE
	(MG/L)										(NUMBER/100ML)		(MG/L)	
01/16/74	1.60	.010-	4.0		18	.0100	84	.010-	.02		330		.020	.050
02/20/74	.60	.010-	2.4		18	.0100-	51	.010-	.01-		10-		.020	.038
03/13/74	.50	.010-	1.9		17	.0100-	30	.010-	.01-		10-		.040	.018
04/17/74	.60	.010-	1.0-		24	.0100-	30	.010-	.01-		10-		.030	.018
05/15/74	.30	.010-	5.2		40	.0100-	12	.010-	.01-		700		.080	.028
06/20/74	1.00	.010-	1.1		21	.0100-	22	.010-	.01-		10-		.020	.017
07/24/74	2.10	.010-	2.0		32	.0100-	28	.010-	.01-		10-		.020-	.007
08/21/74	2.50	.010-	1.7		7	.0100-	34	.010-	.01-		10		.020-	.007
09/18/74	2.80	.010-	2.2		18	.0100-	30	.010-	.01-		10-		.020-	.001-
10/23/74	.10	.010-	2.8		8	.0100-	22	.010-	.01-				.020-	.020
11/20/74	2.00	.010-	2.9		10	.0100-	23	.010-	.01-		10-		.020-	.044
12/18/74	1.90	.010-	3.7		18	.0100-	31	.010-	.01-		2000		.020	.052
MINIMUM	.10	.010	1.0		7	.0100	12	.010	.01		10		.020	.001
MAXIMUM	2.80	.010	5.2		40	.0100	84	.010	.02		2000		.080	.052
AVERAGE	1.33	.010	2.6		19	.0100	33	.010	.01		283		.027	.025
GEO.MEAN	.94	.010	2.3		17	.0100	30	.010	.01		33		.025	.015
MEDIAN	1.30	.010-	2.3		18	.0100-	30	.010-	.01-		10-		.020-	.019

SAMPLING DATE	DO FIELD	FLUORIDE	HARDNESS	IRON	LEAD	MANGANESE	MERCURY	NICKEL	NITRATES	NITROGEN	THRESHOLD ODORS	OIL GREASE	PCB	PH FIELD	PH LAB
	(MG/L)						(PPB)		(MG/L)			(MG/L)	(PPB)		
01/16/74	11.2	.3		1.8	.030	.210	.300	.340	.8	.4	2.0	3.3		7.9	7.6
02/20/74	14.0	.3		1.0	.060	.130	.100-	.070	1.2	.1	2.0	0.8		7.7	7.5
03/13/74	11.1	.4		.6	.030	.120	.100-	.040	1.7	.2	2.0	3.5		7.9	7.4
04/17/74	9.8	.2		.6	.020-	.130	.100-	.060	1.7	.7	4.0	4.7		8.0	7.5
05/15/74	9.2	.5		3.1	.050	.200	.100	.040	.9	1.3	2.0	1.4		8.1	7.4
06/20/74	7.1	.3		.8	.080	.150	.100-	.070	.9	.1-	4.0	5.6		7.7	7.9
07/24/74	6.6	.3		.6	.020	.110	.300	.060	.4	.3	1.0	11.4	.01-	7.7	7.9
08/21/74	5.8	.4		.6	.020	.110	.100-	.040	.4	.1-	1.0	2.4		7.9	7.8
09/18/74	6.9	.3		.5	.070	.120	.100-	.030	.9	.7	1.0	2.9		7.9	7.1
10/23/74	8.0	.4		.7	.050	.110	.300	.040	.2	.3	2.0	2.5		8.0	7.3
11/20/74	9.2	.4		.6	.040	.210	.700	.040	.5	.5	1.0	2.4			7.6
12/18/74	11.9	.5		.9	.030	.160	.300	.060	.7	.7	2.0	4.5			8.4
MINIMUM	5.8	.2		.5	.020	.110	.100	.030	.2	.1	1.0	1.4	.01	7.7	7.1
MAXIMUM	14.0	.5		3.1	.080	.210	.700	.340	1.7	1.3	4.0	11.4	.01	8.1	8.4
AVERAGE	9.2	.4		1.0	.042	.147	.217	.074	.9	.4	2.0	4.3	.01	7.9	7.6
GEO.MEAN	8.9	.3		.8	.037	.142	.170	.057	.7	.3	1.8	3.7	.01	7.9	7.6
MEDIAN	9.2	.3		.6	.035	.130	.100-	.050	.8	.3	2.0	3.4	.01-	7.9	7.5

NOTE: PARAMETER VALUES WITH A (-) SIGN FOLLOWING THE NUMBER INDICATES THAT THE OBSERVED VALUE WAS LESS THAN THE NUMBER INDICATED

Table 2. (Cont'd) STATION TC 1.3

TRAIL CREEK - WALKER STREET BRIDGE, MICHIGAN CITY, 1974

SAMPLING DATE	PHENOL	PHOS-PHORUS	PHTHA-LATES	POTAS-IUM	SELENIUM	SODIUM	SOLIDS SUSP.	SOLIDS VOL.	SOLIDS TOTAL	SPEC.COND (MICRO-MHO/CM)	SUL-FATES	TEMP. FIELD DEG C	TUR-BIDITY	ZINC	FLOW
	(MG/L)		(PPB)			(MG/L)					(MG/L)			(MG/L)	(CFS)
01/16/74	.003	.30		4.0		60.0	52	13		790	82.0	2		.340	
02/20/74	.002	.15		3.0		34.0	32	13		680	78.0	4		.170	
03/13/74	.001-	.09		4.0		21.0	17	9		650	88.0	7		.210	
04/17/74	.001	.12		4.0		22.0	12	1		570	70.0	12		.250	
05/15/74	.001	.24		3.0		13.0	130	18		350	48.0	13		.200	
06/26/74	.001	.12		4.0		20.0	12	4		600	78.0	17		.170	
07/24/74	.001	.22	.50-	4.0		23.0	3	3		570	54.0	20		.190	
08/21/74	.009	.14		4.0		22.0	23	4		560	52.0	23		.110	
09/18/74	.006	.18		4.0		24.0	11	1		620	60.0	18		.120	
10/23/74	.003	.10		5.0		24.0	2	1-		640	70.0	10		.080	
11/20/74	.005	.12		4.0		19.0	11	1-		630	90.0	7		.060	
12/18/74	.006	.31		4.0		20.0	26	8		690	95.0	1		.110	
MINIMUM	.001	.09	.50	3.0		13.0	2	1		350	48.0	1		.060	
MAXIMUM	.009	.31	.50	5.0		60.0	130	18		790	95.0	23		.340	
AVERAGE	.003	.17	.50	3.9		25.2	28	6		612	72.1	11		.167	
GEO.MEAN	.002	.16	.50	3.9		23.4	16	4		603	70.4	8		.151	
MEDIAN	.002	.14	.50-	4.0		22.0	14	4		625	74.0	11		.170	

NOTE: PARAMETER VALUES WITH A (-) SIGN FOLLOWING THE NUMBER INDICATES THAT THE OBSERVED VALUE WAS LESS THAN THE NUMBER INDICATED

Source: Indiana Stream Pollution Control Board

Table 3. STATION TC .3

TRAIL CREEK - FRANKLIN STREET BRIDGE, MICHIGAN CITY 1975

SAMPLING DATE	ALKALINITY	AMMONIA	ARSENIC	BOD	BARIUM	COD	CADMIUM	CHLORIDES	CHROME HEX	CHROME TOTAL	COLIFORM FECAL	COLIFORM TOTAL	COPPER	CYANIDE
					(MG/L)						(NUMBER/100ML)		(MG/L)	
01/22/75		.40	.010-	2.1		1	.0010-	24	.010-	.01-	50		.020-	.011
02/19/75		.20	.010-	2.7		8	.0100-	8	.010-	.01-	170		.020-	.023
03/19/75		1.60	.010-	1.9		22	.0100-	31	.010-	.01-	4700		.020	.015
04/16/75		1.70	.010-	2.5		10	.0100-	30	.010-	.03	190		.020-	.009
05/14/75		2.30	.010-	3.2		13	.0100-	26	.010-	.01	320		.020-	.003
06/18/75		1.70	.010-	2.2		32	.0100-	21	.010-	.02	3700		.020-	.009
07/30/75		2.50	.010-	3.1		13	.0100-	22	.010-	.01-	210		.020-	.003
08/20/75		2.30	.010-	3.1		23	.0100-	20	.010-	.01-	2100		.050	.010
09/17/75		.30	.010-	1.7		14	.0100-	11	.010-	.01-	30		.040	.002
10/22/75		1.10	.010-	1.6		12	.0100-	13	.010-	.03	110		.040	.003
11/19/75		.50	.010-	2.4		8	.0100-	11	.010-	.01-	10		.020-	.001
12/17/75		.50	.010-	1.4		24	.0100-	25	.010-	.01-	3900		.020-	.024
MINIMUM		.20	.010	1.4		1	.0010	8	.010	.01	10		.020	.001
MAXIMUM		2.50	.010	3.2		32	.0100	31	.010	.03	4700		.050	.069
AVERAGE		1.22	.010	2.3		15	.0092	20	.010	.01	1216		.026	.014
GEO.MEAN		.46	.010	2.2		12	.0083	19	.010	.01	293		.024	.007
MEDIAN		1.15	.010-	2.3		13	.0100-	21	.010-	.01-	200		.020-	.009

SAMPLING DATE	DO FIELD	FLUORIDE	HARDNESS	IRON	LEAD	MANGANESE	MERCURY	NICKEL	NITRATES	NITROGEN	THRESHOLD ODORS	OIL GREASE	PCB	PH FIELD	PH LAB
			(MG/L)				(PPB)		(MG/L)			(MG/L)	(PPB)		
01/22/75	12.1	.2	.3	.030	.050	.100-	.020-	.5	.4	1.0	1.0-	.01-			8.2
02/19/75	13.4	.3	.3	.020-	.050	.100	.020	.4	.4	1.0	3.8				7.0
03/19/75	9.3	.3	.9	.020	.130	.100-	.050	.5	.1-	1.0	10.0				6.8
04/16/75	9.2	.4	.7	.020-	.140	.100-	.050	.5	.7	1.0	26.0	.01-			7.2
05/14/75	7.3	.2	.4	.030	.110	.100-	.030	.5	.1	2.0	15.0	.01-			7.2
06/18/75	5.0	.3	1.2	.050	.140	.200	.030	.5	.7	2.0	17.0	.01-			6.1
07/30/75	4.1	.2	.9	.030	.110	.100	.020	.2	.4	2.0	3.0	.01-			7.2
08/20/75	5.0	.3	1.1	.020-	.120	.200	.030	.3	.3	1.0	3.4	.01-			7.2
09/17/75	7.0	.2	.4	.020	.040	.080	.020-	.2	.3	1.0	2.6	.01-			7.9
10/22/75	9.0	.2	.5	.030	.050	.300	.020	.1	.1-	1.0	24.0	.01-			8.0
11/19/75	10.2	.3	.5	.020-	.020	.100-	.020-	.4	.3	1.0	22.0	.01		7.7	8.5
12/17/75	10.4	.2	1.2	.020	.100	.100	.030	1.2	.6	1.0-	6.5	.01-		7.5	7.2
MINIMUM	4.1	.2	.3	.020	.020	.020	.020	.1	.1	1.0	1.0	.01		7.5	6.1
MAXIMUM	13.4	.4	1.2	.030	.140	.300	.050	1.2	.7	2.0	29.0	.01		7.7	8.5
AVERAGE	8.7	.3	.7	.024	.096	.142	.028	.4	.4	1.2	11.9	.01		7.6	7.4
GEO.MEAN	8.2	.3	.7	.024	.082	.130	.027	.4	.3	1.2	7.5	.01		7.6	7.3
MEDIAN	9.2	.2	.7		.110	.100-	.005	.4	.3	1.0	5.2	.01-		7.6	7.2

SAMPLING DATE	PHENOL	PHOS-PHORUS	PHTHALATES	POTASSIUM	SELENIUM	SODIUM	SOLIDS SUSP.	SOLIDS VOL.	SOLIDS TOTAL	SPEC.COND (MICRO-MHO/CM)	SULFATES	TEMP. FIELD DEG C	TURBIDITY	ZINC	FLOW
	(MG/L)		(PPB)	(MG/L)										(MG/L)	(CFS)
01/02/75	.005	.1-	.5-	2.0		10.0	1	1-		300	35.0			.050	
02/19/75	.005	.05		2.0		10.0	18	8		340	28.0			.050	
03/19/75	.005	.04		4.0		23.0	6	2		580	72.0	6		.060	
04/16/75	.001	.19	.5-	3.0		20.0	10	4		560	66.0	8		.080	
05/14/75	.001-	.15	.5-	3.0		15.0	7	1		440	58.0	13		.050	
06/18/75	.007	.17	.5-	3.0		15.0	29	7		470	60.0	23		.040	
07/30/75	.005	.14	.5-	3.0		20.0	10	3		520	52.0	26		.030	
08/20/75	.002	.02	.6	3.0		15.0	11	2		460	46.0	18		.230	
09/17/75	.005	.03-	.5	2.0		7.0	1	1-		300	28.0	19		.050	
10/22/75	.005	.1	.5-	2.0		10.0	12	6		360	38.0	15		.060	
11/17/75	.003	.1-	.5	2.0		7.0	6	5		250	29.0	11		.030	
12/17/75	.002	.1	.5-	4.0		15.0	32	12		340	63.0	4		.050	
MINIMUM	.001	.01	.5	2.0		7.0	1	1		250	28.0			.030	
MAXIMUM	.007	.41	.6	4.0		23.0	32	12		580	72.0	26		.230	
AVERAGE	.004	.12	.5	2.7		14.0	12	4		413	47.9	12		.070	
GEO.MEAN	.003	.08	.52	2.7		13.3	8	3		400	45.3	8		.060	
MEDIAN	.004	.11	.5 -	3.0		15.0	10	3		410	49.0			.050	

NOTE: PARAMETER VALUES WITH A (-) SIGN FOLLOWING THE NUMBER INDICATES THAT THE OBSERVED VALUE WAS LESS THAN THE NUMBER INDICATED. PARAMETER VALUES OF ALL NINES (9999.99) INDICATES THAT THE OBSERVED VALUE WAS MORE THAN THE NUMBER INDICATED

Table 3. (Cont'd)

Source: Indiana Stream Pollution Control Board

Table 3. (Cont'd) STATION TC 1.3

TRAIL CREEK - WALKER STREET BRIDGE, MICHIGAN CITY 1975

SAMPLING DATE	ALKALINITY	AMMONIA	ARSENIC	BOD	BARIUM	COD	CADMIUM	CHLORIDES	CHROME HEX	CHROME TOTAL	COLIFORM FECAL	COLIFORM TOTAL	COPPER	CYANIDE
	(MG/L)										(NUMBER/100ML)		(MG/L)	
01/22/75		2.60	.010-	2.5		9	.0100-	50	.010-	.01-	10-		.020-	.015
02/19/75		1.10	.010-	1.9		29	.0100-	41	.010-	.01-	160		.020-	.007
03/19/75		1.40	.010-	3.0		23	.0100-	34	.010-	.01-	80		.020-	.027
04/16/75		1.30	.010-	2.1		18	.0100-	30	.010-	.03	10-		.020-	.007
05/14/75		2.00	.010-	2.2		29	.0100-	32	.010-	.01-	10-		.020-	.006
06/18/75		1.10	.010-	3.3		30	.0100-	38	.010-	.01-	1700		.020-	.014
07/30/75		3.00	.010-	2.2		17	.0100-	26	.010-	.01-	10-		.020-	.011
08/20/75		5.60	.010-	3.3		24	.0100-	27	.010-	.01-	40		.020	.021
09/17/75		3.20	.010-	1.7		30	.0100-	28	.010-	.01-	10-		.030	.010
10/22/75		4.00	.010-	1.6		14	.0100-	26	.010-	.03	10		.030	.012
11/19/75		2.60	.010-	2.9		16	.0100-	25	.010-	.01	10		.020	.011
12/17/75		.80	.010-	1.8		50	.0100-	27	.010-	.01	10		.150	.024
MINIMUM		.80	.001	1.6		9	.0100	22	.010	.01	10		.020	.006
MAXIMUM		5.60	.010	3.9		30	.0100	50	.010	.03	1700		.150	.027
AVERAGE		2.77	.009	2.5		22	.0100	31	.010	.01	172		.032	.014
GEO.MEAN		2.06	.008	2.4		20	.0100	30	.010	.01	26		.025	.012
MEDIAN		2.30	.010-	2.2		21	.0100-	27	.010-	.01-	10-		.020-	.011

SAMPLING DATE	DO FIELD	FLUORIDE	HARDNESS	IRON	LEAD	MANGANESE	MERCURY	NICKEL	NITRATES	NITROGEN	THRESHOLD ODORS	OIL GREASE	PCB	PH FIELD	PH LAB
	(MG/L)						(PPB)		(MG/L)			(MG/L)	(PPB)		
01/22/75	11.0	.4		.4	.030	.170	.200	.040	.9	.6	1.0	1.0-			7.8
02/19/75	11.4	.5	1.1	.020	.160	.100-	.050	.040	.9	.7	1.0	25.0	.01-		7.9
03/19/75	9.7	.3	1.2	.020	.150	.100-	.040	.040	.6	.3	1.0	10.0			6.8
04/16/75	8.6	.3	.7	.020-	.130	.100-	.050	.040	.4	.3	1.0	28.0			7.1
05/14/75	7.9	.4	.8	.030	.140	.100-	.080	.040	.5	.1-	2.0	10.0			7.8
06/18/75	6.2	.3	1.3	.020-	.130	.200	.040	.040	.8	1.1	1.0	22.0			7.0
07/30/75	6.3	.3	.8	.050	.110	.100	.030	.030	.4	.4	1.0	2.9			7.1
08/20/75	5.7	.3	1.1	.040	.130	.200	.060	.040	.5	.1-	1.0	3.5			7.5
09/17/75	7.0	.4	.8	.040	.110	.100	.040	.040	.3	.2	1.0	2.9			7.5
10/22/75	6.4	.4	.9	.030	.150	.200	.020	.020	.1-	.1-	1.0	29.0			8.3
11/19/75	7.0	.3	.8	.040	.140	.100	.060	.060	.9	.5	1.0	21.0		7.7	8.5
12/17/75	11.1	.4	1.6	.040	.190	.100-	.040	.040	1.7	.9	1.0-	3.2		7.5	7.1
MINIMUM	5.7	.2	.7	.020	.110	.100	.020	.020	.1	.1	1.0	1.0	.01	7.5	6.8
MAXIMUM	11.4	.5	1.6	.050	.190	.200	.080	.060	1.7	1.1	2.0	29.0	.01	7.7	8.5
AVERAGE	8.5	.4	.9	.032	.142	.133	.045	.042	.7	.4	1.1	13.7	.01	7.6	7.5
GEO.MEAN	8.3	.3	.9	.030	.140	.126	.043	.042	.5	.3	1.1	8.9	.01	7.6	7.5
MEDIAN	8.2	.3	.8	.030	.140	.100	.040	.040	.5	.3	1.0	10.0	.01-	7.6	7.5

SAMPLING DATE	PHENOL	PHOS-PHORUS	PHTHA-LATES	POTAS-IUM	SELENIUM	SODIUM	SOLIDS SUSP.	SOLIDS VOL.	SOLIDS TOTAL	SPEC.COND (MICRO-MHO/CM)	SUL-FATES	TEMP. FIELD	TUR-BIDITY	ZINC	FLOW
	(MG/L)		(PPB)			(MG/L)					(MG/L)	DEG C		(MG/L)	(CFS)
01/22/75	.006	.13		4.0		26.0	8	4		530	78.0	3		.110	56
02/19/75	.003	.09	-.50-	3.0		27.0	38	24		480	72.0	1		.100	112
03/19/75	.003	.52		4.0		23.0	12	2		590	76.0	6		.080	82
04/16/75	.001	.11		4.0		20.0	12	7		550	74.0	8		.080	57
05/14/75	.001	.11		3.0		29.0	8	1		540	66.0	13		.060	58
06/18/75	.003	.19		3.0		15.0	51	12		480	60.0	21		.070	107
07/30/75	.005	.14		4.0		25.0	10	4		570	70.0	25		.040	34
08/20/75	.006	.23		4.0		21.0	16	4		450	54.0	21		.170	36
09/17/75	.007	.26		4.0		22.0	3	1		600	58.0	13		.020	36
10/22/75	.007	.16		4.0		22.0	21	9		590	68.0	16		.120	37
11/17/75	.002	.09		4.0		20.0	4	2		490	66.0	11		.090	29
12/17/75	.002	.38		4.0		17.0	48	13		460	54.0	3		.100	61
MINIMUM	.001	.09	-.50	3.0		15.0	3	1		450	54.0	1		.040	29
MAXIMUM	.007	.52	.50	4.0		27.0	51	24		600	88.0	25		.170	112
AVERAGE	.004	.21	.50	3.7		21.6	19	7		527	68.0	12		.092	59
GEO. MEAN	.003	.19	.50	3.7		21.3	13	5		525	67.3	9		.087	53
MEDIAN	.003	.15	-.50-	4.0		21.5	12	4		535	68.0			.090	56

NOTE: PARAMETER VALUES WITH A (-) SIGN FOLLOWING THE NUMBER INDICATES THAT THE OBSERVED VALUE WAS LESS THAN THE NUMBER INDICATED
PARAMETER VALUES OF ALL NINES (999.99) INDICATES THAT THE OBSERVED VALUE WAS MORE THAN THE NUMBER INDICATED

Table 3.(Cont'd)

Source: Indiana Stream Pollution Control Board

Data acquired through the U.S. E.P.A. STORET System for Lake Michigan is for 1972 and consequently not usable for this discussion since it is outdated and not substantiated by more recent data.

In terms of enhancement of the salmonid fishes program, Stream Pollution Control Board Regulation SPC-12 (Natural spawning areas, rearing or imprinting areas and migration routes of salmonid fishes) is being enforced, where possible, by the State of Indiana. Further elaboration on this subject is not possible at this time due to insufficient information.

A second source of water quality data is through the National Pollution Discharge Elimination System (NPDES) program. This program is operated by the Indiana Stream Pollution Control Board and regulates discharges into navigable waters from all point sources of pollution, including municipal treatment plants and industries. The permit includes abatement measures necessary to meet effluent limitations based on Indiana's Stream Pollution Control Board regulations and standards for the respective receiving streams. An example of a NPDES permit is presented in Appendix A.

Through the NPDES permits, it was found that one municipal, six industrial and two semi-public (Mobile Home Parks) dischargers exist within the CZM area. Municipal dischargers are required by their permit to monitor their effluent on a daily basis for the parameters listed in Table 4. The Michigan City Waste Treatment Plant constitutes all the municipal dischargers for the CZM area.

TABLE 4 MUNICIPAL DISCHARGER PARAMETER MONITORING REQUIREMENTS

Parameter
Flow
Bod's
Suspended Solids
Fecal Coliform
Residual Cllorine
pH
Total Phosphorus
Ammonia
Total Nitrogen

Source: Indiana State Board of Health

TABLE 5 INDUSTRIAL DISCHARGER PARAMETER MONITORING REQUIREMENTS

Parameter
Flow
pH
Oil & Grease
Suspended Solids
Temperature

Source: Indiana State Board of Health

Industrial dischargers are required to monitor for the parameters listed in Table 5. Depending on their specific product line, some industries are required to monitor for additional parameters such as nickel and total chromium in addition to those parameters listed in Table 5. The six industries in the CZM area are listed in Table 6.

Two semi-public dischargers are located within the CZM area. Both are required to monitor for the same parameters as the municipal discharger with the exception of total phosphorus, ammonia and total nitrogen.

The general format for enforcement of violations of the NPDES permits is contained in the sample NPDES permit, Part II, Management Requirements (Appendix A).

Pollution Sources

There are two types of pollution sources: point and non-point. Point source pollution refers to that type of pollution which arises from a central location and is released in quantity and concentration compatible with practical means of removal (i.e. pollution from a sewage treatment plant). From the previous section, the NPDES permitees mentioned would, therefore, come under this heading.

Another point source pollution type is confined feedlot operations. Indiana's Confined Feeding Control Law (Public Law 175, Acts of 1971, IC 1971, 13-1-5.7) defines confined feeding to mean: "the feeding of animals grown for feed, fur or pleasure purposes in lots,

TABLE 6: INDUSTRIAL DISCHARGERS LOCATED WITHIN THE COASTAL ZONE MANAGEMENT AREA

Industry	NPDES Permit Number
Northern Indiana Public Service	0000116
Joy Manufacturing Company	0000183
Arno Adhesive Tapes, Inc.	0000272
Phillips Drill Company	0000299
InterRoyal Corporation	0032565
Berko Electrical Mfg. Corp.	0032689

Source: Indiana State Board of Health

pens, ponds, shed or buildings where food is supplied to them by means other than grazing". A livestock operator must have his operation registered given any of the following:

a) if he confine feeds at one location 300 or more cattle, 600 or more swine or sheep or 30,000 or more fowl

b) if he violates the Indiana Stream Pollution Control Law or regulations of the Indiana Stream Pollution Control Board

c) if he elects to come under the law.

There exists only one registered feedlot operations within the CZM area; Section 32, Township 38N, Range 3W or approximately one mile northeast of the Interstate 94 and State Road 20 intersection. This operation consists of 150 finishing hogs and possesses a waste control facility of solid manure storage.

Non-point pollution sources may be defined as that type of pollution which arises from a dispursed location and is exported in a manner not compatible with practical means of removal (i.e. agricultural runoff). Since the CZM area encompasses approximately 79% agricultural, vacant or forested land, non-point pollution could have a marked influence on the overall pollution problem.

Unfortunately, non-point pollution is a subject that has not received adequate discussion in the past and, as a consequence, little or no data exist for the CZM area. This particular problem will be addressed in more detail through a joint CZM-208 Water Quality Management Plan effort. Information that has been or will be obtained

and analyzed through 208 will include:

Detailed Aerial Photography and Interpretation of Land Use/Cover

Soils Data

Agricultural Data

Demographic Data

Completion of the 208 program is scheduled for February 1978.

Waste Load Allocations

Guidelines from the State of Indiana for determining waste load allocations (maximum pollutant level to be tolerated from a given municipal, industrial and semi-public discharger) for existing and future NPDES permit holder are presented in Appendix B.

These guidelines, although very technical, propose two basic concepts: (1) the establishment of a base upon which effluent limitations can be assigned and NPDES permits issued by the Stream Pollution Control Board to point source dischargers for application on NPDES permits for the period ending July 1, 1983 and (2) to ultimately restore, maintain and protect the area's water quality.

The development of these allocations is a required interim output requirement of the 208 Water Quality Management Plan and is scheduled to be completed as of August 1977. During this process, the previously described NPDES permit holders in the CZM area will be reviewed in terms of their present pollutant loading or waste

loading of their respective receiving streams. Allocations; that is, quality and quantity of pollutants that they will be able to discharge into their receiving waters in the future, will also be reviewed.

Existing Waste Treatment Facilities

There are nine waste treatment facilities located in the Coastal Zone area. The municipal, industrial and semi-public dischargers were mentioned in earlier sections of this report. All six industrial dischargers identified possess a small package waste treatment facility. The same is true of the two semi-public dischargers.

As previously mentioned, only one municipal discharger exists within the CZM area, the Michigan City Waste Treatment Plant. It has a capacity of 15 Million gallons per day with a wastewater flow of 10 Million gallons per day. The method of treatment is activated sludge and the degree of treatment is primary and secondary with chlorination and removal of phosphorous and nitrogen. The plant generates 35,000 gallons per day of sludge and it is treated in sludge digesters and drying beds.

III.6 PHYSICAL DATA ACQUISITION - AIR QUALITY

The purpose of this section is to review existing air quality data in order to better determine the effects of future land-use decisions. It includes existing climatological data as well as the ambient air quality and a review of existing and potential air pollution sources. Mention is also made of three special conditions that may effect air pollution in the study area. This section is concerned with the LaPorte County portion of the Indiana Coastal Zone.

Climatic Conditions

Climatological data for the Coastal Zone area is gathered at the Coast Guard Coastal Station at Michigan City. The U.S. Weather Bureau does not maintain a weather station in the study area. The only Weather Bureaus located near the area are the stations in LaPorte and South Bend. The Coast Guard Station collects data every three hours and has data on sky conditions, visibility, wind direction, wind speed, and air temperature. According to Coastal Station data taken from January to December, 1975, prevailing winds are from the southwest or south with winds from the north frequently in the winter. The Michigan City Airport Plan reports that generally higher velocity winds are from north while lower velocity winds are from the south.

Air temperature is also taken at the Coast Guard Station. The mean monthly temperature at the station is:

JAN.	FEB.	MAR.	APR.	MAY.	JUNE
29^{o}	27^{o}	34^{o}	42^{o}	59^{o}	70^{o}

JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
73^{o}	73^{o}	61^{o}	55^{o}	47^{o}	32^{o}

The mean yearly temperature is 50^{o}.

Since there is no long term precipitation data available for Michigan City, the data from the LaPorte station was used. For the period 1931 - 1960 the mean amount of precipitation was 49.94 inches. This level of precipitation is substantially higher than for surrounding area. Explaination offered for this higher precipitation indicate that the area is affected by air pollution from the Calumet area and moisture laden air from Lake Michigan.

Ambient Air Quality and Sources of Pollutants

Air quality for the study area was sampled at three stations in the Michigan City area from January, 1973 to October, 1974 by the Michigan City Department of Air Pollution Control. The parameters that were tested for were total suspended particulates, nitrogen dioxide and sulfur dioxide. According to the standards set by the Air Pollution Control Board of the State of Indiana, none of the parameters tested exceeded the standards set by the state. Also, in a conversation with Karl Hilberg, the Michigan City Air Pollution Control Agent on June 25, 1976, he indicated that at present there

were no problems with any dischargers in the area. He said that their emissions fell below the standards. The worst area identified was the Indiana State Prison but their emissions were also acceptable. There are some supermarkets and schools that operate incinerators but they also fall below the standards. Residential areas are not a problem because no open burning is allowed in Michigan City. There is no specific problem with any transportation systems but there has been a definite increase in nitrous oxides and carbon monoxides since the completion of I-94. An increase has also been detected around the Marquette Mall area where there is a heavy concentration of automobiles.

Special Conditions

The lake is the major factor that effects the weather in the study area. Its effect, however, is more beneficial than detrimental in regards to air quality. Due to the fact that there is an off-shore breeze in the evening and an on-shore breeze in the morning, the air is constantly being circulated and the frequency of inversions is greatly reduced.

The other special condition is the alledged LaPorte Anomaly. Precipitation data for the area shows that precipitation in the LaPorte area is substantially higher than for surrounding stations in Northern Indiana - nearly 50 inches annual average as compared to annual averages in the range of 35 to 40 inches for surrounding areas. Reasons given for this elevated precipitation include lake

effects and the effect of industrial pollution in the Chicago-Gary area. The lake effect occurs as moisture laden air coming across Lake Michigan is forced upward by the terrain. As the Lake Michigan air is forced upward, it is cooled and precipitation occurs in the LaPorte area. Other researchers have indicated that precipitation in the LaPorte area varies with steel production in the Chicago-Gary area and that the pollution from this urban/industrial complex tends to stimulate precipitation in the LaPorte area. The controversy centers on whether the data are accurate and that the LaPorte area actually receives more annual precipitation than surrounding areas. If the anomaly actually exists, as David Maxwell of the Indiana State Board of Health - Air Pollution Control Division, in his paper The Validity of the LaPorte Anomaly: A Critical Review feels, then the study area may be affected due to its close proximity to LaPorte. This area has been included in a three year weather study by the Illinois State Water Survey to determine if, in fact, the anomaly does exist. The study will cover the period 1976 - 1978. No reports will be available until 1977.

112.1 ECONOMIC AND SOCIAL DATA ACQUISITION -- ECONOMIC DATA

The purpose of this section is to review existing data relative to the population, income, employment, and major industries within the Indiana Coastal Zone in order to compare the economic character of this area with the State's economic situation.

Historical Population Trends

The population of LaPorte County has generally grown at a faster rate than that of the State itself. This rapid historical growth can be attributed in part to industrialization within the northern portion of the County, particularly within the Michigan City Area. The population of LaPorte County increased by approximately 175% from 1900-70 while that of the State increased by only 106%.

Within the Coastal Zone Area of LaPorte County the largest actual numerical growth has taken place within Michigan Township. It went from a population of 15,367 in 1900 to 40,135 in 1970. This represents an increase of approximately 160%.

The fastest rate of population growth is found within Coolspring Township. It went from a population of 1,406 in 1900 to 10,654 in 1970. This represents an increase of approximately 655% during this 70 year time span. The largest portion of the total growth of Coolspring Township has taken place during the last decade, with the population almost doubling from 1960-70.

On the following page is a Table detailing the actual changes in population at 10 year intervals within the State, the County, and the Coastal Zone Area Townships.

HISTORICAL POPULATION TRENDS

TABLE 7

State of Indiana, LaPorte County, Coastal Zone Area Townships -- 1900-1970

	POPULATION						
	1900	1910	% Change	1920	% Change	1930	% Change
Indiana	2,516,462	2,700,876	7.3	2,930,390	8.4	3,238,503	10.5
LaPorte County	38,386	45,797	19.3	50,443	10.1	60,490	19.9
Center Township	8,501	11,445	34.6	16,277	42.2	17,413	6.9
Coolspring Township	1,406	1,425	1.3	1,264	-11.2	1,762	39.3
Michigan Township	15,367	19,584	27.4	19,956	1.8	28,098	40.7
Springfield Township	1,063	891	-16.1	807	-9.4	969	20.0

	1940	% Change	1950	% Change	1960	% Change	1970	% Change
Indiana	3,427,796	5.8	3,934,224	14.7	4,662,498	18.5	5,193,669	11.3
LaPorte County	63,660	5.2	76,808	20.6	95,111	23.8	105,342	10.7
Center Township	18,655	7.1	22,464	20.4	24,431	8.7	24,437	0.0
Coolspring Township	2,109	19.6	2,978	41.2	5,353	79.7	10,654	99.0
Michigan Township	28,472	1.3	32,415	13.8	38,676	19.3	40,135	3.7
Springfield Township	1,327	36.9	1,726	30.0	2,880	66.8	4,182	45.2

Source: U.S. Bureau of the Census

Population Projections

Population projections by the Indiana State Board of Health indicate that within the next 30 years the population of LaPorte County will increase by 14%, going from 105,342 in 1970 to 119,978 by the year 2000. These same projections indicate an increase in the State's population of approximately 27% during this time span. Assuming these projections are correct, they would appear to indicate a slower growth rate in the industrial base of LaPorte County, than for the state as a whole.

The States County level population projections have recently been broken down to the township level by considering known historical population trends and expected future developments. These projections indicate some rather interesting development within the Coastal Zone. For example, while LaPorte County is not expected to increase in population as rapidly as the rest of the State from 1970-2000, several townships within it and the Coastal Zone are expected to have more rapid growth. The population of Coolspring Township is expected to increase by approximately 46%, going from a population of 10,654 in 1970 to 15,597 by the year 2000. Likewise, the population of Springfield Township is expected to increase by approximately 35%.

Contrary to the trends of Coolspring and Springfield Townships, the population of Michigan Township is projected to decrease by almost 2000 inhabitants. This population loss will primarily be the result of out migration from Michigan City.

POPULATION PROJECTIONS

TABLE 8

	Projections				Percent Change		
	1970	1980	1990	2000	1970-80	1980-90	1990-2000
State of Indiana	5,193,700	5,575,400	6,086,600	6,582,100	7.3	9.2	8.1
LaPorte County	105,342	108,076	114,229	119,978	2.7	5.6	5.1
Coastal Zone Townships							
Coolspring	10,654	12,105	14,050	15,597	13.6	16.1	11.0
Michigan	40,135	36,638	36,781	38,153	-8.7	.4	3.7
Springfield	4,182	4,431	5,026	5,639	6.0	13.4	12.2

Source: State Board of Health, Indiana County Population Projections 1975-2000, 1976

Michiana Area Council of Governments

Population projections for the State of Indiana, LaPorte County, and each of the Coastal Zone Townships are detailed in Table 8.

Per Capita Money Income

Per capita money income within LaPorte County has generally been somewhat higher than that for the State as a whole. As of January 1, 1970, the difference was approximately 4% with the County having a per capita income of $3,193 and the State $3,070. Estimates of 1972 per capita income indicate that this gap has narrowed to approximately 3.5% with the County having a per capita income of approximately $3,830 per year and the State $3,702. The higher levels of per capita income in LaPorte County as compared to the State are largely due to higher levels of industrialization. The State as a whole is largely agricultural, and farm incomes are generally lower than those for non-agricultural employment.

Of the Townships within the Coastal Zone, Coolspring has the highest per capita income. In 1969 it was $3,523 per year (15% greater than that of the State). By 1972 it had increased to $4,382, an increase of 24.4%.

Springfield Township has the lowest per capita income within the Coastal Zone. In 1969 it was approximately 4% lower than that of the State, and 7% lower than that of the County. This discrepancy remained relatively constant through 1972.

On the following page is a breakdown of per capita money income for the Coastal Zone Townships, LaPorte County, and the State for 1969 and 1972. Noticeable differences in per capita income between these two dates are largely the result of inflation.

PER CAPITA MONEY INCOME TABLE 9

	1969 (Census)	1972 (Estimate)	Percent Change
State of Indiana	3,070	3,702	20.6
LaPorte County	3,193	3,830	19.9
Coastal Zone Townships:			
Coolspring	3,523	4,382	24.4
Michigan	3,170	3,699	16.7
Springfield	2,956	3,563	20.5

SOURCE: U. S. Department of Commerce (Bureau of Census) Population Estimates and Projections, Series P-25, May 1975

Employment

Based on the Census of Population there were approximately 2,016,400 individuals employed in the State of Indiana in 1970. Approximately 2% of these, or about 41,197 individuals, were working in LaPorte County. Information indicating the areas in which these individuals were employed is provided on the following page.

Several interesting employment similarities can be noticed by examining this information. Immediately noticeable is the dominance in both the State and the County of manufacturing. Approximately 35% of all employment in the State and 42% of all employment within the County fall within this category. Also noticeable is the heavy reliance by both economies on the categories of: 1) Services, and 2) Trade. The category of Communication and Utilities contains the lowest levels of employment within each economy.

EMPLOYMENT

TABLE 10

	1970 State of Indiana	1970 LaPorte County
Agriculture, Forestry, & Fisheries	68,466	1,114
Mining & Construction	114,688	2,386
Manufacturing	723,205	17,252
Transportation	64,847	1,435
Communication & Utilities	53,881	1,070
Trade	385,652	7,904
Finance	83,380	1,161
Services	446,833	7,645
Public Administration	75,433	1,230
TOTAL	2,016,365	41,197

SOURCE: 1970 Census of Population

Labor Force

In 1970 LaPorte County had a labor force of 42,652 workers of which 41,197 were employed and 1,455 unemployed. This calculates to an unemployment rate of 3.5%. During the same time period, the unemployment rate for the State of Indiana was approximately 4.3%.

By 1975, unemployment had increased substantially in both the State and the County. This increase was due to the nationwide recession which didn't bottom out until early 1976. The 1975 annual average unemployment rates for LaPorte County and the State of Indiana were 8.9 and 8.6% respectively.

Estimates by the Indiana Employment Security Division indicate steadily improving state and local economies during the first half of 1976. By June, the unemployment rate for the State had decreased to 5.6% and the County to 6.5%. The higher level of unemployment in the County at midyear is largely the result of a greater relative dependence by its economy on industrial employment as compared to the State which is more agriculturally oriented.

While there is no readily available data covering strictly the Townships within the Coastal Zone Study Area, unemployment within it is believed to be somewhat higher than that of the County as a whole. This belief is based on the high levels of unemployment within Michigan City which contains much of the population base of the area.

On the following page is a summary of the Labor Force for the years of 1970 and 1975. It indicates: 1) The size of the Labor Force; 2) The number employed and unemployed; and 3) The unemployment rate for these two years.

LABOR FORCE SUMMARY TABLE 11

	Labor Force	Employed	Unemployed	Rate
State of Indiana				
1970 (Census)	2,103,434	2,016,365	87,069	4.3
1975 Annual Average	2,394,000	2,188,000	206,000	8.6
LaPorte County				
1970 (Census)	42,652	41,197	1,455	3.5
1975 Annual Average	46,300	42,150	4,150	8.9

SOURCE: 1970 Census of Population

Indiana Employment Security Division
Indiana Labor Market Letter

Projected Employment

The only employment projections available relevant to the Coastal Zone Study Area of LaPorte County were published by the Michigan City Planning Department in June of 1969. Unfortunately, these projections no longer appear realistic in light of recently released population projections and employment statistics. New employment projections are, therefore, necessary for this portion of the Coastal Zone.*

*Note: The 1969 Michigan City employment projections are included in Appendix C of this document.

112.2 ECONOMIC AND SOCIAL DATA ACQUISITION - SOCIAL DATA

The purpose of this section is to describe the social characteristics of the LaPorte County coastal area which is made up of Michigan, Springfield and Coolspring Townships. Characteristics covered include housing, education, cultural facilities, recreation, transportation and public health, safety and services. This description includes maps illustrating inventories of educational, cultural and recreational facilities, as well as major elements of the area's transportation network.

Housing

According to the 1970 Census of Population, there were 34,804 housing units in LaPorte County. Over half of these units (17,219) were in the county's three coastal area townships. As indicated in Table 12, by the year 2000 the county and coastal area housing stocks are expected to increase to 44,777 and 21,704 respectively, in order to house the area's projected population and provide vacancies necessary for an orderly housing market. These projections imply a net increase in housing stock of 10,571 for the County and 3,485 in the County portion of the Coastal Zone for the 30 year period from 1970 to 2000. This net increase would not include needs for replacement of housing lost due to fire, deterioration, conversion or other causes. According to the 1970 Census of Housing, over the period 1960 to 1970 some 6,787 units were added to the County's housing stock.

HOUSING UNITS: Estimates and Projections

Table 12

	Census	Estimate	Projections		
	1970	1973	1980	1990	2000
LaPorte County	34,206	35,844	37,646	41,162	44,777
Coastal Zone Townships	17,219	17,966	18,092	20,213	21,704
Coolspring Township	3,051	3,281	3,883	4,736	5,433
Michigan Township	12,880	13,367	12,762	13,727	14,239
Springfield Township	1,288	1,318	1,447	1,750	2,032

Sources: State Board of Health, Indiana County Population Projections 1975-2000, 1976.

Michiana Area Council of Governments

Bureau of the Census, 1970 Census of Housing, 1972

U.S. Dept. of Commerce (Bureau of Census) Population Estimates and Projections, Series P-25, May 1975

While this rate of construction, if continued, would be more than adequate to meet future demands, problems must be expected in the area of providing safe, decent, sanitary housing for lower income persons.

The estimates and projections in Table 12 are based on 1973 Census Bureau population estimates and township level population projections prepared by the Michiana Area Council of Governments. Township population projections, in turn, were based on the 1976 State Board of Health projections for LaPorte County. The housing unit projections were developed by dividing the projected population (presented in the preceding section) by the projected population per household and adding a 4.5 percent vacancy factor.

Educational and Cultural Facilities

The educational and cultural facilities of the LaPorte County coastal area are listed in Table 13 with locations illustrated in Figure 1. Most of these facilities are located in Michigan City and, as indicated by Figure 1, many of the cultural facilities are located in close proximity to Lake Michigan. Based on area population trends, other than renovation, most of the need for educational facilities will be in the developing suburban areas of Michigan City. Area historical sites are listed in Appendix "D" along with a brief description and their location. Three of the listed facilities, the Lighthouse Museum, Barker Civic Center and the Michigan Central Repair Shop (Tonn and Blank Building)

EDUCATIONAL AND CULTURAL FACILITIES TABLE 13

LaPorte County Coastal Zone

Public High Schools

Barker Junior High - Barker Road, Michigan City
Elston Junior High - Detroit, MC
Elston Senior High - Detroit, MC
Krueger Junior High - Springland Ave., MC
Rogers Senior High - 8466 W. Pahs Road, MC

Public Elementary Schools

Central - E. 8th, Michigan City
Coolspring - 9121 W. 300 N, MC
Eastport - E. Michigan, MC
Edgewood - Boyd Circle, MC
Jefferson - Wabash, MC
Joy - E.Coolspring Ave., MC
Knapp - Bolka Ave., MC
Long Beach - Long Beach
Marsh - E. Homer, MC
Mullen - 100 Manny Ct., MC
Niemann - Royal Road, MC
Park - McClelland Ave., MC
Pine, Brown Road, MC
Riley - S. Carroll Ave., MC
Springfield - 3045 W. 800 N, LaPorte
Garfield Special Education School - Elston

Parochial Schools

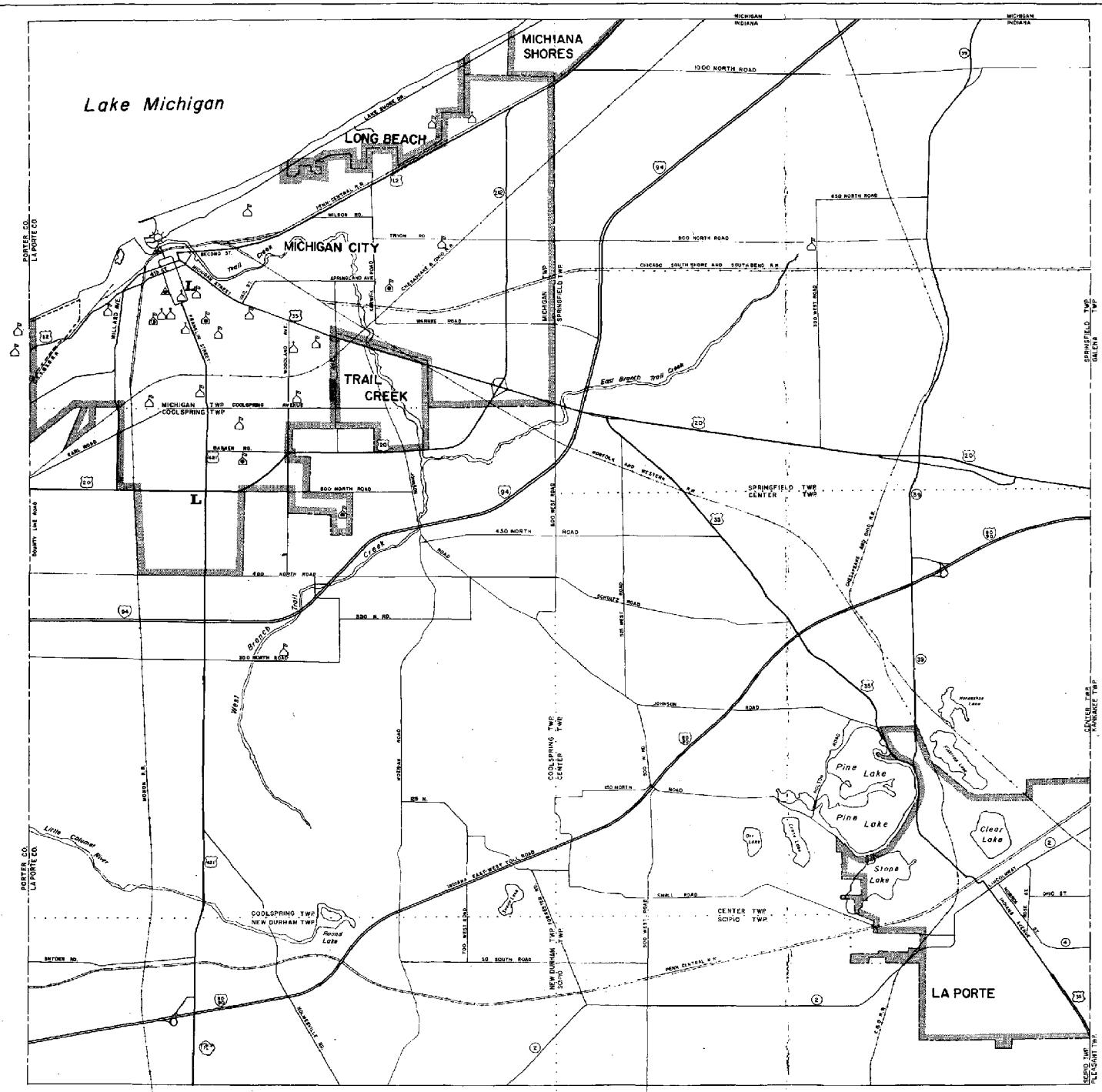
Marquette High School - 306 W. 10th, MC
Notre Dame Catholic School - 1000 Moore Road, MC
Queen of All Saints Catholic School - 526 Woodland Ave., MC
St. Mary Roman Catholic Elementary School, 312 W. 10th, MC
St. Paul Christian Day School & Kindergarten, 114 E. 9th, MC
St. Stanislaus School - 1506 Washington, MC

Libraries

Michigan City Public Library - E.8th, MC
Marquette Mall Branch - Marquette Mall, MC

Art Centers/Museums

Old Lighthouse Museum - Washington Park, MC
Barker Civic Center - 631 Washington, MC



EDUCATIONAL AND CULTURAL FACILITIES

- PUBLIC HIGH SCHOOL
- PUBLIC ELEMENTARY SCHOOL
- PAROCHIAL SCHOOL (all levels)
- COLLEGE OR UNIVERSITY
- SPECIAL EDUCATION
- L LIBRARY
- HISTORICAL SITE
- ART CENTER OR MUSEUM

MICHIANA AREA COUNCIL OF GOVERNMENTS

FIGURE 1

C-1

are on the National Register of Historical Sites. These properties are protected from adverse effects which might occur through federally funded programs. The Michiana Area Council of Governments will also consider the impacts on these sites in all of its planning programs.

Educational Attainment

According to the 1970 Census, LaPorte County ranked 59th among the Indiana counties in the percentage of population over 24 who had completed 4 years of high school and 13th in percent having completed 4 years of college. While data were not available for townships, the data presented in Table 14 for Michigan City would indicate that levels of educational attainment were slightly lower in the LaPorte County coastal area than for the balance of the county.

EDUCATIONAL ATTAINMENT - 1970 TABLE 14

	School Years Completed (persons 25 or older)				
	% 4 or less	% 4 of H.S. or more	% 4 of college or more	Median	% 14-17 in school
State of Indiana	3.2	52.9	8.3	12.1	92.6
LaPorte County	3.1	48.8	6.5	11.8	92.5
Michigan City	3.9	44.5	5.7	11.4	91.5

Source: Census of Population: 1970

Park and Recreation Resources and Needs

In LaPorte County there are currently some 9,973 acres of land devoted to some form of recreation or open space. In the three townships comprising the Coastal Zone study area, some 2,000 acres are devoted to public recreational use. Table 15 lists the larger park and recreation areas in the study area and two adjacent townships, and Figure 2 shows the relative size and location of these facilities. Data developed for this category, including a more detailed listing and description of facilities found in Appendix E came from the Michigan City Comprehensive Planning Program, LaPorte County Plat Book, and the 1973 LaPorte County Open Space Inventory.

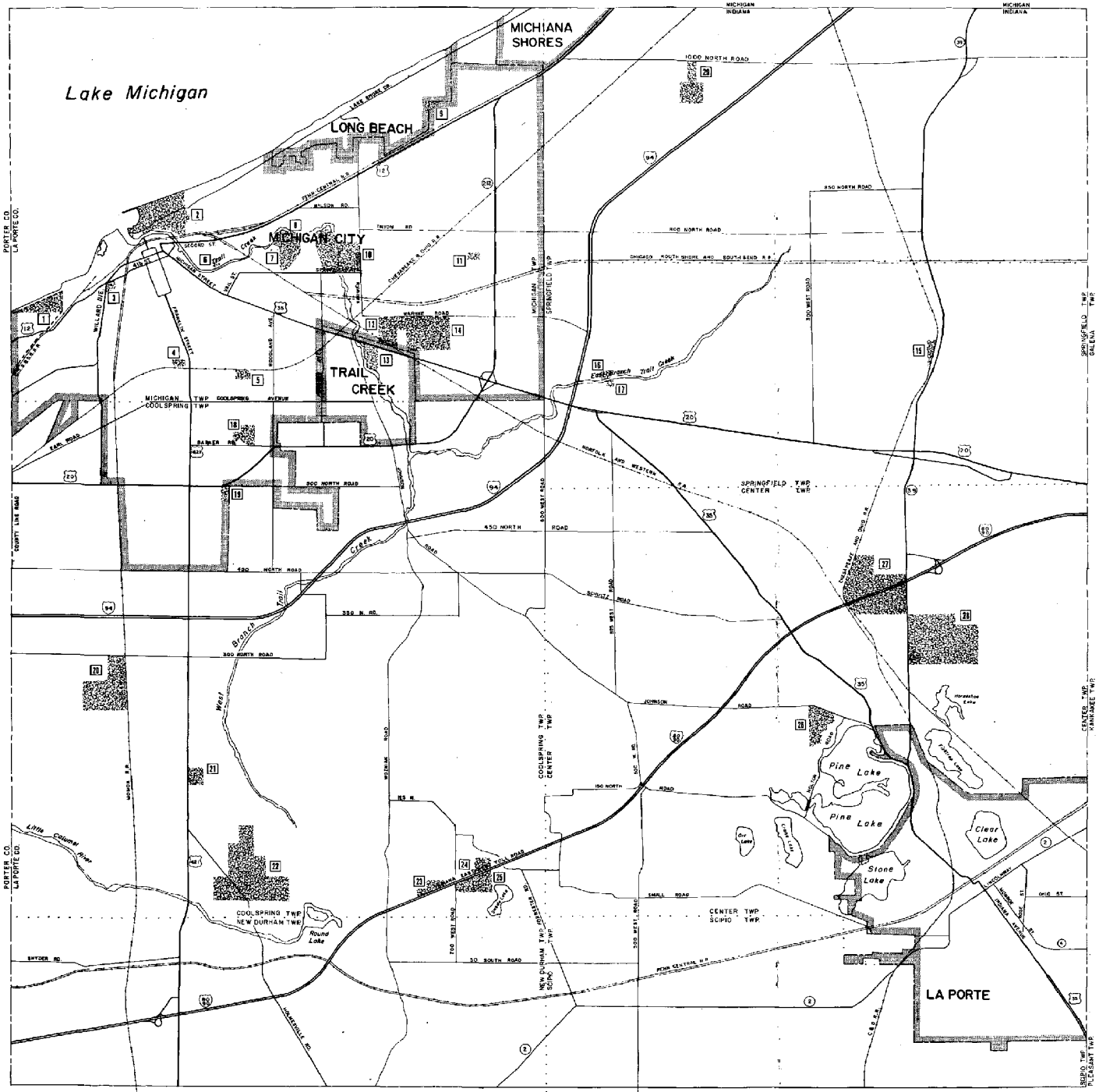
Resources in the study area include several facilities which serve as a recreational resource for areas far beyond the Coastal Zone. Three examples of such facilities are Washington Park, Cutty's Camp Grounds, and International Friendship Gardens. Surveys of Washington Park users show visits from Illinois and Michigan as well as Indiana; Cutty's rental lists show campers from both Canada and Mexico; and International Friendship Gardens guest book shows visitors from as far as Europe. This shows that the Coastal Zone area presents a unique and limited resource for recreational and other development and must be prepared to serve needs far beyond the immediate area.

Table 16 indicates current and projected recreation needs generated by the population of the area itself. The needs identified in Table 16 are based on the projected population of the area and on general standards of 10 acres of local and 15 acres of regional

INVENTORY OF RECREATIONAL FACILITIES IN CZM STUDY AREA TABLE 15

(1) West Beach, Michigan-30
(2) Washington Park & Zoo, Michigan-20
(3) Pullman Park, Michigan-29
(4) Ames Field, Michigan-32
(5) Gardena Playground, Michigan-33
(6) Hansen Park, Michigan-28
(7) Krueger Memorial Park, Michigan-27
(8) International Friendship Gardens, Michigan-27
(9) Long Beach Golf Course, Michigan-14
(10) Pottowatomie Country Club, Michigan-27
(11) Tall Timber Park, Michigan-25
(12) Sullair Corp. Park, Michigan-35
(13) Michigan City Fish & Game Club, Michigan-35
(14) Michigan City Municipal Golf Course, Michigan-35
(15) LaPorte Fish Hatchery, Springfield-35
(16) Wildwood Park, Springfield-5
(17) Michigan City Rifle Club, Springfield-5
(18) Barker Road Forest Preserve, Coolspring-4
(19) Jacks Putt & Sock, Coolspring-9
(20) Michigan City Hunting Club, Coolspring-19
(21) KOA Michigan City, Coolspring-28
(22) Pottawatomie Council of BSA, Coolspring-33
(23) Pinhook Bog, Coolspring-35
(24) Motts Woods, Coolspring-36
(25) Ski Valley Inc., Coolspring-36
(26) Elks Country Club Golf Course, Center-21
(27) Cuttys Camp Grounds, Center-10
(28) Cha-Mar Hills Golf Club, Center-14
(29) Lucky Stables, Springfield-17

NOTE: Figure 2 locates the larger tracts of recreational land. For a more detailed listing, see Appendix E.



PARKS AND RECREATIONAL FACILITIES

30 PARK OR RECREATIONAL AREA WITH REFERENCE NUMBER

MICHIANA AREA COUNCIL OF GOVERNMENTS

FIGURE 2

C-1

park facility per 1,000 population. Table 16 shows that, based purely on quantitative analysis, most of the recreation needs of the area will be taken care of for the foreseeable future. If the zone is to serve the recreation needs of a broader area, and it surely will, then there will be a substantially greater need for recreational facilities that should be addressed by the Coastal Zone Management Program.

Transportation

Data from the Indiana State Highway Commission shows some 1569 miles of roads in LaPorte County including 207 miles of State highways, 330 miles of city and town streets and 1032 miles of County roads. Major roads serving the coastal area of LaPorte County are shown in Figure 2. U. S. 12 passes east-west through the Zone parallel to the coast extending toward the Calumet area to the west and to Michigan and Detroit to the east. U. S. Routes 421 and 35 radiate outward from Michigan City with 421 toward the Lafayette area and Indianapolis via State Route 43 and Interstate 65, and 35 toward LaPorte, Logansport, Kokomo and Indianapolis. There are two major circumferential routes which function as bypass routes. These are U. S. 20/State 212 which passes through the outer fringes of Michigan City and Interstate 94 which runs roughly parallel to 20/212 approximately two miles to the south and east. Routes U. S. 20 and U. S. 20/State Route 2 provide access to the South Bend - Elkhart area.

PARKS AND RECREATION ACREAGE NEEDS *
BY LOCALITY FOR CZM STUDY AREA

TABLE 16

	Existing			Projections					
		1970		1980		1990		2000	
Localities	Public Acres	Population	(+) Surplus (-)Deficient	Population	(+) Surplus (-)Deficient	Population	(+) Surplus (-)Deficient	Population	(+) Surplus (-)Deficient
Coastal Zone	2,010 Ac**	54,971	+ 636 Ac	53,174	+ 681 Ac	55,857	+ 614 Ac	59,389	+ 525 Ac
Coolspring	559 Ac	10,654	+ 293 Ac	12,105	+ 256 Ac	14,050	+ 208 Ac	15,597	+ 169 Ac
Michigan	884 Ac	40,135	- 120 Ac	36,638	- 32 Ac	36,781	- 36 Ac	38,153	- 70 Ac
Springfield	144 Ac	4,182	+ 40 Ac	4,431	+ 33 Ac	5,026	+ 18 Ac	5,639	+ 3 Ac

44.

* Surplus and deficient figures from MACOG standards of 15 acres/1,000 population for regional needs and 10 acres/1,000 population for local needs or a 25 acres/1,000 population.

** Total Coastal Zone acreage includes 423 acres of recreational land in large tracts from Center Township which is outside CZM study area but still in CZM drainage basin.

Major highway improvements are scheduled for U. S. 20 and U. S. 421. U. S. 20 is scheduled to be widened and improved from the Porter County line to Woodlawn Avenue. As part of a program to increase the effectiveness of the Interstates, U. S. 421 is scheduled for improvement from Coolspring Avenue to Interstate 94, and later to the Indiana Toll Road.

The coastal area is served by five railroads including the South Shore and AMTRAK for passenger service and the C&O, L&N, and N&W for freight service. According to 1975 County assessment records there was 21 miles of main and 12 miles of side track for passenger lines and 30 miles of main and 22 miles of side track for freight lines. Major rail lines are also shown on Figure 2.

There are two airports in the coastal area including Phillips and Michigan City Municipal. Phillips is a private airport located at the east edge of Michigan City on U. S. 20. Phillips has two paved runways of 4250 and 2725 feet. Municipal is located south of Michigan City on U. S. 421 and has one paved runway of 2400 feet. The Michigan City Aviation Commission has studied alternative airport sites and is now considering a master plan to expand the existing airport facilities.

The only port in the LaPorte County portion of the coast is the Michigan City Marina at Washington Park. While the port was once used for commercial shipping, for the past five years the facility has had only recreational use. According to the Marina Director, the basin is 10-16 feet deep and covers an area of 30 acres. The basin has room for 404 boats and is filled to capacity during the summer.

Public Safety Services

According to the 1975 Uniform Crime Reports, Michigan City had a total of 3386 major crimes as defined by the Federal Bureau of Investigation. Police manpower in the area included one officer in Trail Creek and seven in Long Beach. Michigan City had a total staff of 98, including 90 officers and 8 civilians.

Fire protection services in the coastal area are providing Michigan City with a force of 86 and volunteer departments in Long Beach, Michiana Shores, Trail Creek and Springfield and Coolspring Townships.

Public Health Facilities and Needs

There are three hospitals in the coastal area, including Memorial, St. Anthony and Walters, all in Michigan City. According to the Northern Indiana Health Systems Agency's Health Systems Plan (working draft, February 1976), these hospitals have a total bed capacity of 388. The number of beds and percentage of bed utilization in 1974 was: Memorial, 99 and 65.2%; St. Anthony, 200 and 70.8%; and Walters, 89 and 64.9%. For the county as a whole, the Health Systems Plan projected a surplus of 78 beds by 1981. Based on this data and population projections for the area, there is no indication of need for additional hospital bed expansion in the near future. Based on data from the 1975 "Indiana Physicians Profile" and county census population estimates (series P-26), LaPorte County had a total of 113 practicing physicians, or a population of 929 per physician.

Electrical and Natural Gas Supply: Capacity and Needs

Northern Indiana Public Service Company (NIPSCO) supplies the electricity to the northern third of Indiana, including all of the Coastal Zone study area. In 1975 NIPSCO provided 4.4 billion kilowatt hours (KWH) to Lake, Porter and LaPorte Counties. NIPSCO has a total company net demand capacity of 2,545,040 kilowatts. A maximum demand of 1,888,434 kilowatts occurred on July 31, 1975.

Statistics on future needs of the Coastal Zone area are not available. NIPSCO anticipates an estimated 6% per year average increase for its 30 county service areas for the next 5 years. To meet this increasing demand for electricity, NIPSCO has two new generating facilities under construction or planned. The Rollin M. Schahfer plant, with an initial net capacity of 487,000 kilowatts, is under construction in Jasper County near the Kankakee River. Bailly Nuclear One, a 686,000-kilowatt plant, is planned for construction in Porter County on Lake Michigan.

NIPSCO also provides gas for users in Lake, Porter and LaPorte Counties. Usage in these counties for 1975 totaled 164.8 billion cubic feet. NIPSCO's capacity to provide natural gas is limited only by the amount it can purchase from its five pipeline supplies. Due to a national shortage of natural gas, NIPSCO anticipates future supplies to be below present contracts.

Communication Systems

The coastal area is served by two newspapers, the Michigan City News-Dispatch and the LaPorte Herald-Argus. Two radio stations, WIMS-AM and WMCB-FM, are located in the area. Television coverage is provided through stations in Chicago and South Bend.

Water Supply

Both Michigan City and Long Beach draw water from Lake Michigan. Michigan City has a design capacity of 20.0 MGD (Million Gallons/Day) and an average use of 6.5 MGD. The Long Beach system has a design capacity of 1.3 MGD, with average use of .345 MGD. The town of Michiana Shores is served by Michiana, Michigan. The balance of the area depends on individual wells. According to the Michiana Area Council of Governments' "208" Designation Report, existing systems are adequate in terms of quantity and treatment. The quality of ground water supplies will be studied under the MACOG "208" Program.

Waste Water Treatment

The only municipal waste water treatment system in the zone is the one serving the city of Michigan City. This system has a design capacity of 15.0 MGD and average flow of 10.0 MGD. According to the Michiana Area Council of Governments' Preliminary Sewer and Water Plan, the Michigan City system is in need of advanced waste treatment and ammonia removal facilities. The Plan indicates that the towns of Long Beach, Michiana Shores, Pottawattamie Park and

Trail Creek are in need of new systems and should consider receiving service from the Michigan City system.

Solid Waste

Solid waste collection and disposal in the zone is handled by private haulers. Most of the wastes generated by the zone are disposed of at a land fill in Porter County. While solid waste disposal has been a problem throughout much of LaPorte County due to the lack of a suitable disposal site, Michigan City officials indicate that they have a site which could be used by the City if necessary. The city of LaPorte is currently considering development of facilities to use wastes as a fuel for steam generation.

112.5 ECONOMIC AND SOCIAL DATA ACQUISITION - LAND USE AND OWNERSHIP

The purpose of this section is to inventory existing use and ownership of land and water in the LaPorte County portion of the Indiana coastal zone in order to determine trends and demands for the use of the coastal zone.

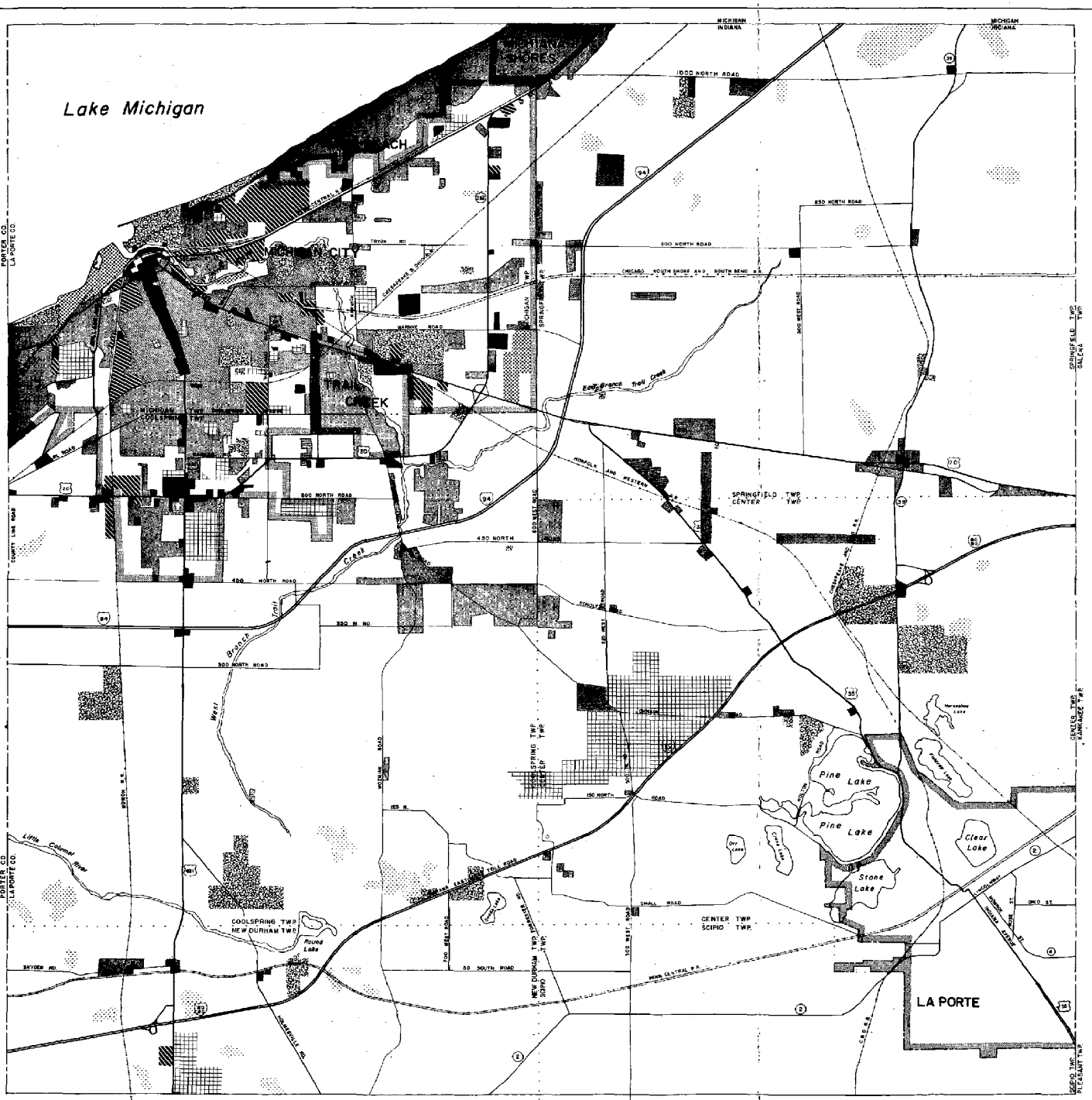
Land Use

Since prevailing patterns of land use do have such a dominant role in determining the potentials for future growth, an understanding of existing land use in the coastal zone is most important to the evolution of a realistic and attainable long-range plan. The analysis presented in this section of the report is aimed at this objective.

During the contract period, a reproducible mylar map overlay was produced depicting Level II land use according to the U.S. Geological Survey Land Use Classification System described in Geological Survey Circular 671 (See Figure 3). The MACOG adaptation of this classification system for use in the coastal zone study is as follows:

Residential
Commercial and Services
Industrial and Extractive
Institutional
Transportation, Communications and Utilities
Open and Other
Agricultural, Vacant and Forest *
Water
Wetland

* Forest land will be determined by Department of Natural Resources, Division of Forestry.



COASTAL ZONE LAND USE

LEGEND

- RESIDENTIAL
- COMMERCIAL & SERVICES
- INDUSTRIAL & EXTRACTIVE
- TRANSPORTATION, UTILITIES COMMUNICATIONS
- INSTITUTIONAL
- OPEN AND OTHER
- AGRICULTURAL & FOREST*
- WATER
- WETLAND

*Forest land will be determined by Dept. of Natural Resources, Div. of Forestry.

MICHIANA AREA COUNCIL OF GOVERNMENTS

FIGURE 3

DNR – CSW 9-78

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The Land Use Map was developed by first adapting and plating the land use information from the LaPorte County Plat Book, Michigan City Comprehensive Planning Program, and U.S. Geological Survey Maps. This beginning information was then updated by staff interpretation of 1973 Soil Conservation Services aerial photographs and analysis of 1976 LaPorte County Road System Maps. Finally, problem areas were eliminated by field observation and/or site inspection.

Following the development of the Land Use Map, an analysis of the distribution of land use was completed. The analysis of this data is summarized in Table 17.

TABLE 17

LAND USE DISTRIBUTION

JURISDICTION		COOLSPRING	MICHIGAN	SPRINGFIELD	COASTAL ZONE
TOTAL ACREAGE		20,307 Ac.	11,494 Ac.	20,608 Ac.	52,409 Ac.
Residential	Ac.	1,827	3,665	874	6,366
	%	9.0	32.0	4.2	12.2
Commercial & Services	Ac.	214	443	35	692
	%	1.1	3.9	0.2	1.3
Industrial & Extractive	Ac.	87	752	---	389
	%	0.4	6.5	---	1.6
Transportation Communication & Utilities	Ac.	---	292	---	292
	%	---	2.5	---	0.6
Institutional	Ac.	377	268	---	645
	%	1.9	2.3	---	1.2
Open & Other	Ac.	571	678	81	1,330
	%	2.8	5.9	0.4	2.5
Agricultural, Vacant & Forest	Ac.	16,910	5,231	19,215	41,356
	%	83.2	45.5	93.2	78.9
Water	Ac.	32	118	12	162
	%	0.2	1.0	0.1	0.3
Wetland	Ac.	289	47	391	727
	%	1.4	0.4	1.9	1.4

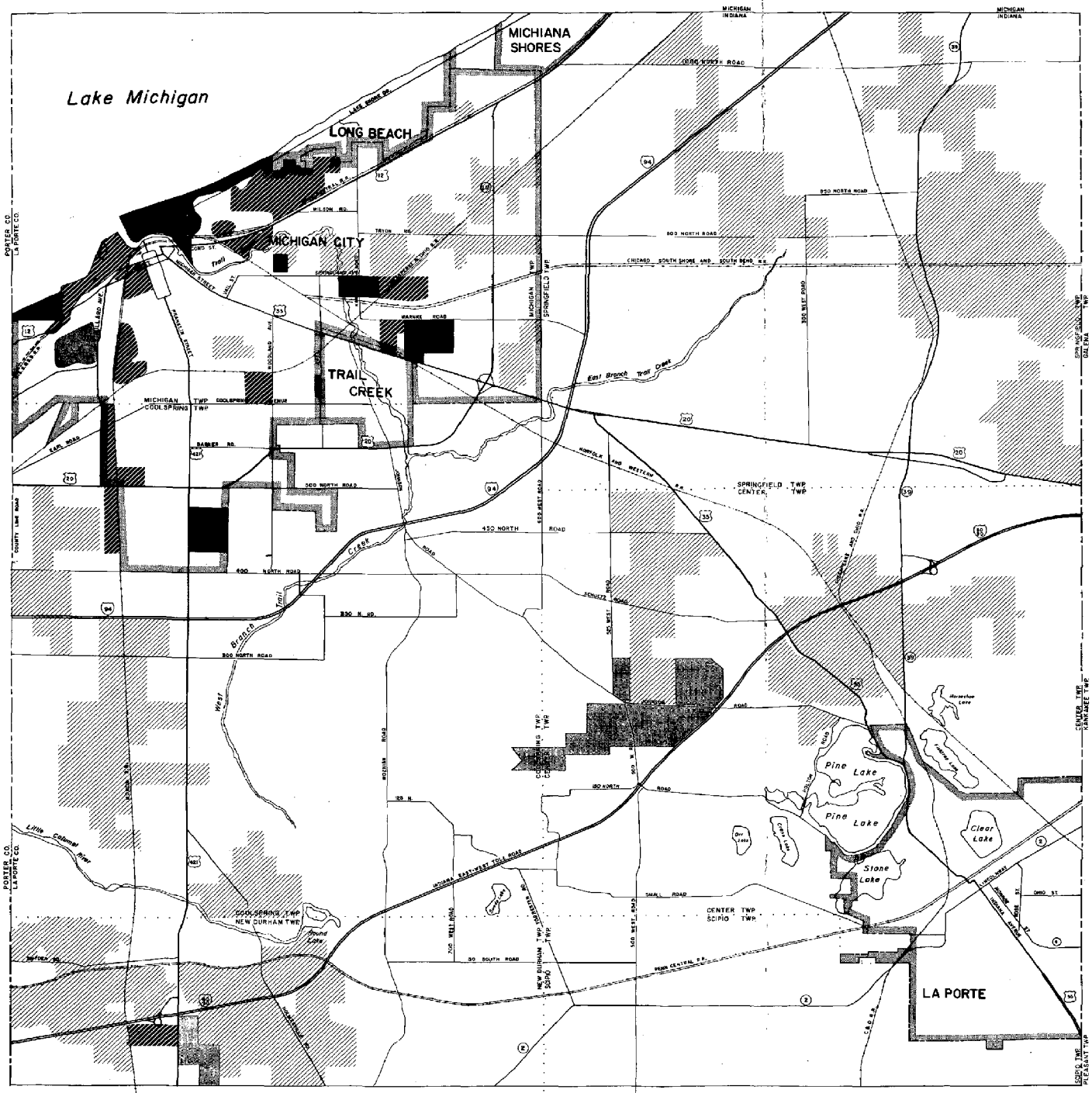
Ownership

In addition to the dominant role existing land use plays in determining patterns and potentials for future growth, ownership is often the deciding factor in establishing locations of that growth. The ownership data presented in this section has been developed to assist in the land use decision-making process. The map showing ownership (Figure 4) has been prepared by (1) mapping ownership from the LaPorte County Plat Book, (2) adding information from the Michigan City Comprehensive Planning Program, and (3) adjusting data after analysis and comparison with the proceeding Land Use Map.

The Ownership Map was prepared identifying:

Classification	Approx. Acres
Large contiguous tracts of privately-owned land:	
(a) Industrial	1,189
(b) Other	13,346
Major tracts of publicly-owned land:	
(c) Federal	None
(d) State	861
(e) County	None
(f) Municipal	561

It should be noted that when identifying these classifications we were concerned with: major, important or prominent; large, approximately 50 acres or more; and groupings of these public and private ownership types. If a classification is shown as "none"; ie. federal and county, it does not mean that it is non-existent, but that it does not meet the above general guidelines.



COASTAL ZONE OWNERSHIP

LARGE TRACTS OF PRIVATE LAND

- INDUSTRIAL
- OTHER

MAJOR TRACTS OF PUBLIC LAND

- FEDERAL (HOME)
- STATE
- COUNTY (HOME)
- MUNICIPAL

MICHIANA AREA COUNCIL OF GOVERNMENTS

FIGURE 4

CSW 12-7-76

C-1

APPENDICES

INDIANA STREAM POLLUTION CONTROL BOARD

AUTHORIZATION TO DISCHARGE UNDER THE

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act, as amended, (33 U.S.C. 1251 et seq., the "ACT"), and Public Law 100, Acts of 1972, as amended, (IC 1971, 13-7, et. seq., the "Environmental Management Act"),

is authorized to discharge from a facility located at

to receiving waters named

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I and II hereof.

The permit shall become effective on .

This permit and the authorization to discharge shall expire at midnight, _____, 19___. In order to receive authorization to discharge beyond the date of expiration, the permittee shall submit such information and forms as are required by the Indiana Stream Pollution Control Board no later than 180 days prior to the date of expiration.

Signed this _____ day of _____, for the Indiana Stream Pollution Control Board.

_____

Technical Secretary

Permit No.

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning_____ and lasting until_____, the permittee is authorized to discharge from outfall(s)_____. Such discharge shall be limited and monitored by the permittee as specified below:

Discharge Limitations

Effluent Characteristic	kg/day (lbs/day) Daily Average	Daily Maximum	Other Limitations Average	Maximum	Monitoring Measurement Frequency	Equipment Sample Type

a. The pH shall not be less than_____nor greater than_____. The pH shall be monitored as follows:_____.

b. The discharge shall not cause excessive foam in the receiving waters. The discharge shall be essentially free of floating and settleable solids

c. The discharge shall not contain oil or other substances in amounts sufficient to create a visible film or sheen on the receiving waters.

d. Samples taken in compliance with the monitoring requirements above shall be taken_____

B. MONITORING AND REPORTING

1. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. Reporting

The permittee shall submit monitoring reports to the Indiana Stream Pollution Control Board containing results obtained during the previous month and shall be postmarked no later than the 28th day of the month following each completed monitoring period. The first report shall be submitted by_____ for the month of_____.

The Regional Administrator may request the permittee to submit monitoring reports to the Environmental Protection Agency if it is deemed necessary to assure compliance of the permit.

3. Definitions

a. Daily Average

1. Weight Basis - The "daily average" discharge means the total discharge by weight during a calendar month divided by the number of days in the month that the production or commercial facility was discharging. Where less than daily sampling is required by this permit, the daily average discharge shall be determined by the summation of the measured daily discharges by weight divided by the number of days during the calendar month when the measurements were made.

2. Concentration Basis - The "daily average" concentration means the arithmetic average (weighed by flow value) of all daily determinations of concentration made during a calendar month. Daily determinations of concentration made using a composite sample shall be the concentration of the composite sample. When grab samples are used, the average (weighed by flow value of all the samples collected during the calendar day.

b. "Daily Maximum" Discharge

1. Weight Basis - the "daily maximum" discharge means the total discharge by weight during any calendar day.

2. Concentration Basis - the "daily maximum" concentration means the daily determination of concentration for any calendar day.

c. The Regional Administrator is defined as the Region V Administrator, U. S. EPA, located at 230 South Dearborn Street, Chicago, Illinois 5066

d. The Indiana Stream Pollution Control Board is located at the following address: 1330 West Michigan Street, Indianapolis, Indiana 4 206.

4. Test Procedures

Test procedures for analysis of pollutants shall conform to regulations published pursuant to Section 304 (g) of the Act, the most recent edition of "Standard Methods for the Examination of Water and Wastewater," or other methods approved by the Indiana Stream Pollution Control Board, under which such procedures may be required.

5. Recording of Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

a. The exact place, date, and time of sampling;

b. The dates the analyses were performed;

c. The person(s) who performed the analyses;

d. The analytical techniques or methods used; and

e. The results of all required analyses.

6. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Indiana Stream Pollution Control Board Monthly Monitoring Report. Such increased frequency shall also be indicated.

7. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation and recording from continuous monitoring instrumentation shall be retained for a minimum of three (3) years, or longer if requested by the Regional Adminstrator or the Indiana Stream Pollution Control Board.

C. SCHEDULE OF COMPLIANCE

1. The permittee shall achieve compliance with the effluent limitations specified for outfall (s) _____ in accordance with the following schedule

2. No later than 14 calendar days following a date identified in the above schedule of compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedical actions taken, and the probability of meeting the next scheduled requirement.

PART II

A. MANAGEMENT REQUIREMENTS

1. Change in Discharge

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit. Any anticipated facility expansions, production increases, or process modifications which will result in new, different, or increased discharges of pollutants must be reported by submission of a new NPDES application or, if such changes will not violate the effluent limitations specified in this permit, by notice to the permit issuing authority of such changes. Following such notice, the permit may be modified to specify and limit any pollutants not previously limited.

2. Containment Facilities

The permittee shall provide approved facilities for containment of any accidental losses of cyanide or cyanogen compounds in accordance with the requirements of the, Stream Pollution Control Board, Regulation SPC-2.

3. Operator Certification

The permittee shall have the waste treatment facilities under the direct supervision of an operator certified by the Indiana State Health Commissioner as required by Acts of 1967, Chapter 273, as amended, (IC 1971, 13-1-6).

4. Noncompliance Notification

If, for any reasons, the permittee does not comply with or will be unable to comply with any daily maximum effluent limitations specified in this permit, the permittee shall provide a Regional Administrator and the State of Indiana with the following information, in writing, within five (5) days after becoming aware of such condition:

a. A description of the discharge and cause of noncompliance; and

b. The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

5. Facilities Operation

The permittee shall at all times maintain in good working order and operate as efficiently as possible, all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

6. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to navigable waters resulting from noncompliance with any effluent limitations specified in this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

7. By-passing

Any diversion from or by-pass of facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited, except (i) where unavoidable to prevent loss of life or severe property damage, or (ii) where excessive storm drainage or runoff would damage any facilities necessary for compliance with the effluent limitations and prohibition of this permit. The permittee shall promptly notify the Indiana Stream Pollution Control Board and the Regional Administrator, in writing, of such diversion or by-pass.

8. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed from or resulting from treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters and to be in compliance with all Indiana statutory provisions, regulations, relative to refuse, liquid and/or solid waste disposal.

9. Power Failures

In order to maintain compliance with the effluent limitations and prohibitions of this permit, the permittee shall either:

a. Provide an alternative power source sufficient to operate facilities utilized by permittee to maintain compliance with the effluent limitations and conditions of this permit which provision shall be indicated in this permit by inclusion of a specific compliance date in each appropriate "Schedule of Compliance for Effluent Limitations", or

b. Upon the reduction, loss, or failure of one or more of the primary sources of power to facilities utilized by the permittee to maintain compliance with the effluent limitations and conditions of this permit, the permittee shall halt, reduce or otherwise control production and/or all discharge in order to maintain compliance with the effluent limitations and conditions of this permit.

B. RESPONSIBILITIES

1. Right of Entry

The permittee shall allow the Technical Secretary of the Stream Pollution Control Board, the Regional Administrator and/or their authorized representatives, upon the presentation of the credentials:

a. To enter upon the permittee's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit; and

b. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; and to sample any discharge of pollutants.

2. Transfer of Ownership or Control

In the event of any change in control or ownership of facilities from which the authorized discharge emanate, the permittee shall notify the succeeding owner or controller of the existence of this permit by letter, a copy of which shall be forwarded to the Indiana Stream Pollution Control Board and the Regional Administrator.

3. Availability of Reports

Except for data determined to be confidential under Section 308 of the Act and as stated in Section 10, of Stream Pollution Control Board Regulation SPC-15 under the authority of IC 1971, 13-7 as amended, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the State Water Pollution Control Agency and the Regional Administrator. As required by the Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Act and Section 3(b), Chapter 13, Public Law 100, Acts of 1972 as amended, (IC 1971, 13-7).

4. Permit Modification

After notice and opportunity for a hearing, this permit may be modified suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully, all relevant facts; or

c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

5. Toxic Pollutants

Notwithstanding Part II, B-4 above, if a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Act for a toxic pollutant which is present in the discharge and such standard or prohibition is more stringent then any limitation for such pollutant in this permit, this permit shall be revised or modified in accordance with the toxic effluent standard or prohibition and the permittee so notified.

6. Civil and Criminal Liability

Except as provided in permit conditions on "By-passing" (Part II, A-7) and "Power Failures"(Part II, A-9), nothing in this permit shall be construed to relieve the permitte from civil or criminal penalties for noncompliance, whether or not such noncompliance is due to factors beyond his control, such as accidents, equipment breakdowns, or labor disputes.

7. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act.

8. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Act.

9. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor infringement of Federal, State or local laws or regulations.

10. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstances, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

11. Construction Permit

a. The permittee shall not construct, install or modify any water pollution control facility without a valid construction permit issued by the Indiana Stream Pollution Control Board.

b. Applications for construction permits for a water pollution control facilities must be made on forms provided by the State and must be submitted together with the required plans, specifications, and description of project 60 days in advance of the date of start of construction unless a shorter time is approved by the Indiana Stream Pollution Control Board.

12. Operation Permit

If the permittee operates a wastewater treatment system and does not discharge this effluent to the waters of Indiana or if the permittee discharges to a municipal sanitary sewer, he must apply for an Operation Permit under Stream Pollution Control Board Regulation SPC-15, Part II, Section 2.

GUIDELINES FOR WASTE LOAD ALLOCATIONS

INTRODUCTION

Point Source Waste Load Allocations (WLA) are a required part of Water Quality Management Planning as included in Part 131.11 (g) of 40 FR, No. 230. In addition, Total Maximum Daily Loads (TMDL) as described in Part 131.11 (f) are necessary to achieve compliance with applicable water quality standards.

As TMDL's and Point Source WLA's have not been comprehensively determined by the State, the computational responsibility in these areas has been delegated to the designated areawide planning agencies under authority of the Act. Where the State has made previous determination of either TMDL's or WLA's, the designated areawide planning agency which is responsible for these appropriate stream segments shall review, update, and revise (if necessary) the State's work.

Although TMDL's and Point Source WLA's are not necessary in effluent limited segments and water quality assessment and segment classifications have been accomplished by the State, the designated areawide planning agencies should become aware that existing and potential water quality problems in their area may have changed since these problems were reflected in the State's classification report. If, through sampling, modelling, and/or monitoring programs, the designated areawide planning agencies find that existing segment classification needs revision, the State should be made aware of any necessary changes as well as pertinent data which supports segment reclassification. Information concerning segment reclassification is applicable to both effluent limited and water quality limited segments. The information will be used to continually monitor Indiana's progress in Water Quality Management, as well as progress in critical areas of the State.

Water Quality Standards

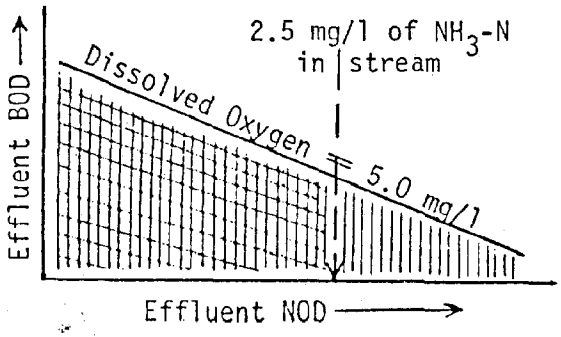
Applicable Water Quality Standards for the State of Indiana are, at this time, established in Regulation SPC 1R-3 "Water Quality Standards for Waters of Indiana". However, a draft of SPC 1R-4 (an update of SPC 1R-3) has recently been prepared and will be presented to the Stream Pollution Control Board at their next meeting. While there are no major changes, it is expected that SPC 1R-4 will become State law before the end of the year. Consequently, WLA techniques should reflect the new Water Quality Standards. This guideline should contain any necessary information regarding changes in Indiana standards. In addition, Water Quality Standards of adjoining States must be considered for both interstate waters and the maintenance of downstream water quality.

All water quality standards will apply at all times when the stream flows are equal to or greater than the average minimum seven-consecutive-day low flow which occurs once in ten years.

Dissolved oxygen concentrations shall average at least 5.0 mg/l per calendar day and shall not be less than 4.0 mg/l at any time. As the computation criterion for WLA's, the minimum D. O. shall be 5.0 mg/l. However, if WLA's and the corresponding mathematical model incorporates photosynthetic effect and respiration, the D. O. minimum of 4.0 mg/l can be used (although D. O. still must average at least 5.0 mg/l per calenday day). Note: trout waters and protected spawning areas must receive special consideration.

The concentrations of toxic substances shall not exceed one-tenth of the 96-hour median lethal concentration for important indigenous species. For the purposes of this guideline, a list of stream water quality units for toxic and/or persistant substances is provided in Appendix A. These criteria have been extracted from NPDES permits for Indiana and considered along with the 304 (a) document of the U. S. Environmental Protection Agency. They are intended to be used strictly as best estimates of reasonable criteria for WLA and TMDL purposes only. In the future, these criteria will be subject to review and revision as will the allocations themselves.

Due to the special concern and controversy over allowable concentrations of ammonia, the WLA's should assume that trade-offs between effluent BOD and effluent NOD should be limited by a (max) of 2.5 mg/l of ammonia-nitrogen in stream (see the following figure). Upstream ammonia concentration, stream dilution, and effluent quality must be considered.



The area below the curve represents D.O. 5.0 mg/l
The cross-hatched area represents amenable trade-offs within the constraints of the instream NH_3-N limit.

The Grand Calumet area has been exempted from the aforementioned D. O. (SPC 7R-2 should be followed) and ammonia considerations because of specific problems characteristic of that area. For more information on that area, the State Board of Health should be contacted.

Waste Load Allocations

Waste Load Allocations for interim output requirements in 208 Areawide Water Quality Management Planning are to be determined for:

(a). establishment of a base upon which effluent limitations can be assigned and permits issued by the State to point source dischargers for application on NPDES permits for the period ending July 1, 1983,

(b). establishment of a base upon which compliance schedules and target abatement dates can be proposed,

(c). ultimately restoring, maintaining, and protecting water quality as declared in Section 101 (Declaration of Goals and Policy) of P. L. 92-500.

The Indiana Water Quality Standards and guidelines for WLA are designed in light of these goals. All discharges are required to meet effluent limitations stringent enough to assure that water quality standards will be met. If existing wastewater treatment (of municipalities and semi-publics) is not sufficient to meet the 1983 effluent standards, a higher level of treatment will be required. In addition, the State's policy of antidegradation will be maintained.

The applicable 1983 effluent limitations standards are reviewed below. Appendix B reviews 1977 effluent limitations standards.

Effluent-limited Segments

Industries - BAT (Best Available Technology economically available)

Municipalities } BPT (well-operated secondary treatment)
Semi-Publics }

30 mg/l BOD_5, 30 mg/l SS (monthly average)

45 mg/l BOD_5, 45 mg/l SS (weekly average)

NH_3-N 10 mg/l summer

Water Quality Limited Segments

Industries - BAT

Municipalities } Upgrade treatment to a level where Water
Semi-Publics } Quality Standards will be met (Advanced Waste Treatment, if necessary).

Waste Load Allocation - General Procedures

The 1983 population projections, associated waste load projections and land use and service area considerations, which have been interpolated from the required 1980 and 1985 outputs, must be used for the generation of wasteload allocations and TMDL's. Industrial waste flows should be taken as they are now known and should not be projected. Because of future technology changes, stream condition changes, water quality standards updates, etc, waste load allocations can only be predicted and implemented in conjunction with the next permit period (July 1, 1983). Any of these aforementioned charges, as well as changes in published effluent limitations guidelines, additions and/or deletions in municipal and industrial dischargers, changes in stream low-flow characteristics, or changes in population equivalents will require new WLA's for the segment.

From the State viewpoint, it should ultimately be the responsibility of the Management Agency involved to choose between cost-effective allocation trade-offs for any changes in dischargers (or potential dischargers) in their area. It should ultimately be the responsiblity of the State to maintain a current segment model which adequately depicts any changes in the stream (including continued model calibration, verification, and sampling). While conflicts within and between segments will arise, appropriate management agencies must realize when wasteload allocations are made, the assimilation capacity of the receiving streams are considered as a baseline and the allocations are to be made on the basis of equitable apportionment of the assimilation capacity. This does not insure that the water quality entering a segment will allow total immediate utilization of all available stream assimilative capacity; rather, the Water Quality Management programs are designed to insure that the water quality standards will be met. Consequently, the designated Management Agencies, in conjunction with the State Board of Health and the Stream Pollution Control Board will be responsible for investigating alternatives (i.e. relocation of outfalls to redistribute the load, etc.) so such conflicts can be resolved.

Assimilative Capacity

An equal and fair distribution of waste assimilation capacity will be made among all dischargers in a water quality limited segment for the waste or wastes that have a cumulative effect upon water quality. With dissolved oxygen as the representative quality control standard, the oxygen concentration is a function of the demands (sinks) and the supplies (sources).

Oxygen Demands	Oxygen Supplies
-BOD	-Reaeration
-COD	-Photosynthetic activity
-Benthal deposits oxidation	-Dilution with water with high D. O.
-Aquatic plant-respiration	
-NOD	
-Low D. O. inputs	

For WLA's, when estimating the assimilative capacity of the stream and associated treatment levels required by municipalities to be within that assimilative capacity (and meet Water Quality Standards), maximum loadings for the biggest discharger and average loadings for the rest of the dischargers should be used. In computing the NOD and associated loadings, 4.57 mg O_2 per mg of ammonia-nitrogen should be used as a conversion factor.

If possible, a percent of the assimilative capacity of the stream should be kept as a reserve for peak loadings and future development. This reserve should be no greater than 30% of the assimilation capacity, and ideally should be the capacity required to assimilate probable future growth for the planning period. Various alternatives which consider different "percent reserve capacities" should be determined and justified. The size of the reserve is dependent upon the rate of growth and the length of the planning period (20 years in this case). Although this planning period is long enough to consider useful life of the facility and finance planning, it does not assure that treatment requirements will not greatly exceed waste treatment technology. For this reason, requirements beyond advanced waste treatment which cannot be planned for at the present time will not be cost-effective solutions. In addition, such solutions which rely on future technological advances should not be considered as sources of future "reserve" at this time. The limit of wasteload reduction and corresponding level of treatment for any individual point source is the BAT for that source as we now know it.

The reserve is intended to allow for both future development and amenable water quality. Therefore, it is apparent in water quality limited segments desiring future development that waste load allocation must be made to a point below the stream (segment) assimilative capacity to allow for such a reserve. When a new municipal discharge is proposed, the corresponding loss of assimilative capacity will be taken from the reserve. Treatment of this new discharger must meet minimum water quality requirements for water quality limited segments and/or additional treatment requirements until either the reduction in assimilation capacity is eliminated or the treatment is equal to that of other dischargers in the established segment. When a new industrial discharge is proposed, that industry must meet U. S. EPA effluent limitation guidelines (BAT) or meet pretreatment requirements (soon to be published) if they discharge to a public treatment works (Sec. 301 (b) (2) of 92-500). However, the magnitude of this new industrial waste flow will determine how much the allocated reserve assimilation capacity will be reduced. Any reduction in assimilation capacity created by diversion of water will be taken from the reserve. Any trade-offs which will reduce the available reserve within any segment should be carefully considered in the best interest of that segment.

In the past, under Section 8 of the Indiana Water Quality Standards, effluent criteria depended on stream dilution and influent concentrations. Wherever streams were modelled, effluent criteria was based on the results of the model. By 1983 and as a result of 208 planning, all water quality limited segments should have been modelled and all effluent criteria should therefore be based on models. Determination and allocation of available stream assimilative capacity will play an increasingly important role in the future.

Total Maximum Daily Loads

Total Maximum Daily Loads (TMDL's) are required calculations according to Part 131.11 (f) of F. R. 40, #230. For purposes of Indiana Water Quality Management Planning, TMDL's are to be required for conservative pollutant parameters. These conservative pollutants do not have an effect on D. O. as a water quality control standard, and are assumed to have no sources or sinks other than local inflows or diversions, but for other reasons (i. e. aquatic toxicity, public health, etc) require limitation.

The total maximum daily (segment) load can be computed by taking the appropriate flows times the water quality (instream) criteria given in Appendix A. These loads must take into account anticipated growth (by a % reserve capacity) in the area over the period ending July 1, 1983 and also provide for seasonal variation by outlining "critical flow conditions".

For each water quality limited segment, the conservative parameters total allocation (TMDL) for point sources are to be delineated and the conservative parameters total allocation (TMDL) for nonpoint sources are to be estimated for the known critical low-flow condition (seven day, one-in-10 year). In addition, other critical flow conditions should be discussed. While specific identification is unrealistic considering current information, critical conditions frequently are (for example) evident after short term, high intensity storms following low-flow conditions. TMDL's could not be calculated in these cases at this time, but such concerns can be explored and discussed and any water sampling or monitoring programs can be developed accordingly. Because local conditions, seasonal variations, storm events, etc. dictate additional critical conditions (other than low flow), all available knowledge and information should be collected and analyzed.

Minimum Requirements for the Water Quality Model

1. The model selected may be deterministic and steady state in nature.

2. The water body may be considered as homogenous with respect to water quality variables; the water body may be considered completely mixed.

3. Longitudinal (lengthwise) dispersion and advection may be considered in the water body.

4. First order reaction kinetics for bacterial and biochemical reactions may be used.

5. The rate of change of oxygen deficiency of river water due to atmospheric reaeration is proportional to the oxygen deficiency of the river water at any particular time. This concept may be used for the model.

6. The biochemical and reaeration processes are influenced by temperature. This has to be incorporated in the model.

7. The self purification process of the river in the model should preferably include all demands (sinks) and supplies (sources) for dissolved oxygen in the segment when significant.

8. The maximum allowable concentration of conservative and/or toxic materials in the river water should be considered for finding the assimilative capacity (TMDL) of the river (by dilution) for those materials.

Assumptions for Headwater

There are several methods for determination of the assimilative capacity of a stream segment of which the measurement of headwater load concentration

is used by the State. The headwater loading is the concentration at some point just upstream from the upper end of the stream reach of interest which is used as the boundary condition. The following assumptions are made in the model:

For Summer Months

1. If available, the latest five year average values of BOD, ammonia, D. O., and other parameters in the headwater are to be used in the model for the flow values in the stream with the upper limit being 3-5 times the summer seven day, one in ten year flow (See Fig. 1). Any low flow data (below seven-day, one-in-ten) may be used.

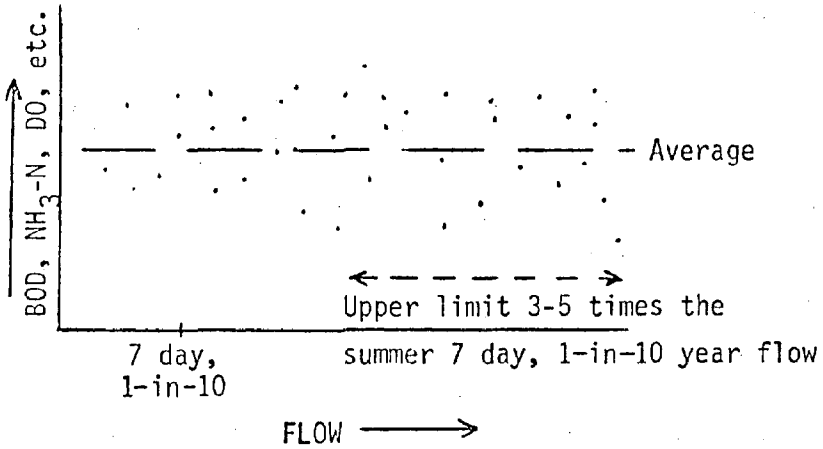


Figure 1. Estimation of Average concentration of parameters in headwater.

2. The daily mean water temperature which is exceeded 10-20 percent of the time for the summer months (June-September) is to be used for the model (see Figures 2 and 3). If available, the latest ten year ambient temperature data in the headwater may be used.

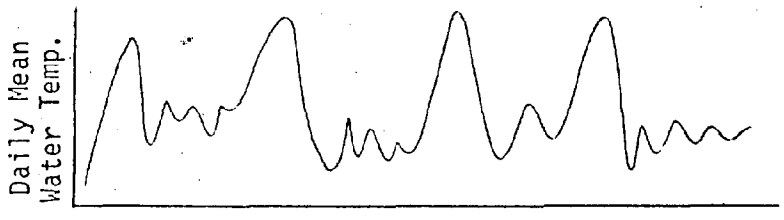


Figure 2. Daily Mean Water Temperature for the summer months.

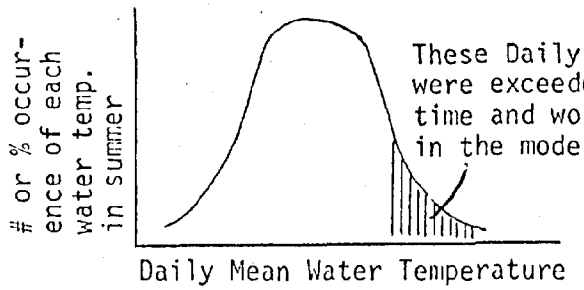


Fig. 3. Distribution of Daily Mean Water Temperature.

3. The summer seven day, one-in-ten year flow in the headwater should be used.

For Winter Months

1. If available, the latest five year average values of BOD, ammonia, D. O. and other parameters in the headwater are to be used in the model for the flow values in the stream with the upper limit being three-five times the seven day, one in ten year flow. Any low flow data (below seven-day, one in ten year flow) may be used.

2. The average of the daily mean water temperature for the months of January and February is to be used for the model (see Fig. 4). If available, latest ten year ambient temperature data in the headwater may be used.

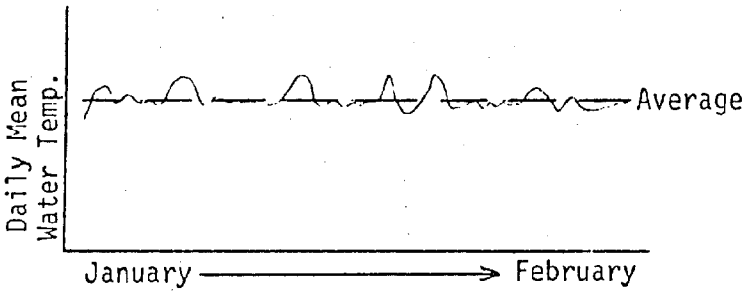


Figure 4. Average of the Daily Mean Water Temperature for Winter Months.

3. The annual seven day, one-in-ten year flow in the headwater should be used.

Appendix A
Water Quality Criteria

Parameter	Purpose	Level
Ammonia	Aquatic Life	2.5 mg/l toxicity limit
Arsenic	Public Water Supply	50.0 ug/l
Barium	Public Water Supply	1.0 mg/l
Beryllium	Aquatic Life	1100.0 ug/l **
Cadmium	Aquatic Life	.012 mg/l **
Chlorine, Total Residual	Aquatic Life	20.0 ug/l for fish (other than) (Salmonids)
Chromium	Public Water Supply	50.0 ug/l
Copper	Aquatic Life	0.1 (96-hour LC50) or 0.02 mg/l
Cyanide	Aquatic Life	0.025 mg/l
Iron	Aquatic Life	1.0 mg/l
lead, dissolved	Aquatic Life	0.01 (96-hour LC50)
Manganese	Public Water Supply	50.0 ug/l
Mercury	Aquatic Life	.0005 mg/l
Nickel	Aquatic Life	0.01 (96-hour LC50) or 0.5 mg/l
Nitrate Nitrogen	Public Water Supply	10.0 mg/l
Oxygen, dissolved	Aquatic Life	5.0 mg/l

See attached page

**May be determined for a certain water system using flow-through bioassays.

Parameter	Purpose	Level
Pesticides		
Aldrin + Dieldrin	Aquatic Life	0.003 ug/l
Chlordane	Aquatic Life	0.01 ug/l
2,4-D	Public Water Supply	100.0 ug/l
2,4,5-T(Silvex)	Public Water Supply	10.0 ug/l
DDT	Aquatic Life	0.001 ug/l
Demeton	Aquatic Life	0.1 ug/l
Endosulfan(Thiodan)	Aquatic Life	0.003 ug/l
Endrin	Aquatic Life Public Water Supply	0.004 ug/l 0.2 ug/l
Guthion	Aquatic Life	0.01 ug/l
Heptachlor	Aquatic Life	0.001 ug/l
Lindane	Aquatic Life Public Water Supply	0.01 ug/l 4.0 ug/l
Malathion	Aquatic Life	0.1 ug/l
Methoxychlor	Aquatic Life Public Water Supply	0.03 ug/l 100.0 ug/l
Mirex	Aquatic Life	0.001 ug/l
Parathion	Aquatic Life	0.04 ug/l
Toxaphene	Aquatic Life	0.005 ug/l
p^H	Aquatic Life Public Water Supply	6.0 to 9.0 5.0 to 9.0
Phenol	Public Water Supply	0.1 mg/l
Phthalate ester	Aquatic Life	3.0 ug/l
Polychlorinated biphenyls	Aquatic Life	0.001 ug/l
Silver	Aquatic Life	0.01(96-hour LC50)
Solids Dissolved	Public Water Supply	250.0 mg/l for chlorides 500 mg/l sulfates
Zinc	Aquatic Life	0.01(96-hour LC50) or 1.0mg/l

Appendix B

1977 Standard

Effluent-Limited segments

Industries - BPT

Municipalities } Secondary Treatment

Semi - Publics }

Water Quality limited segments

Industries } Allocations are based on equitable arrangement

Municipalities } (equal % reduction) to meet water Quality Standards.

Semi-Publics }

PROJECTED EMPLOYMENT

The only employment projections available relevent to the Coastal Zone Study Area of LaPorte County were published by the Michigan City Planning Department in June of 1969. Although these projections are rapidly becoming somewhat dated, they do give a general indication of where employment within this one portion of the Coastal Zone is heading. These projections and the methodology by which they were derived is detailed below as outlined in Michigan City's Comprehensive Planning Program: Economic Base Study.

Projections:

The projection of total labor force potentialities and general employment characteristics serves as a planning guide to the recognition of community needs in the years to come. Since population growth is directly related to employment opportunities, such projections also serve as a valuable cross-check upon independently made population projections such as those presented in Section 2 of this report. Three basic methods of projections are set forth in the following text in order to analyze the potential range of future economic activities.

The first method utilizes the rate of employment growth which occurred in Michigan City from 1961 to 1967, exclusive of the large disproportionate employment growth which occurred in the Transportation Equipment Industry during that period. It is, therefore, a mechanistic method. The rate of growth over the six year period from 1961 to 1967 was calculated from Indiana Employment Security Division figures and divided by six to obtain an annual average percent rate of growth in each of eight industry classifications. These rates were used to

project employment figures to 1990 in five year increments. The annual percent rate of growth calculated in the manner described above assumes the ability of Michigan City to sustain the rate of growth which has occurred over the last six years. There was a particularly spectacular rate of growth in employment during the last six years, which, at least partially, resulted from a decrease in unemployment which was not entirely the creation of new jobs but rather the reactivation of prior job opportunities. Thus the results of this projection are judged to be high and overly optimistic.

Projection 1 shown in Exhibit FF estimates a manufacturing employment of about 17,400 by 1980 and 26,500 by 1990. Total employment is projected at 33,400 by 1980 and 50,500 by 1990.

The second method of projection used is based upon the study undertaken by the Indiana Employment Security Division. Michigan City's current share of total employment in the seven-county Region One is used as a basis for estimating, on a ratio basis, its probable share in the region's projected 1975 employment. In this way, national, state and local considerations, which have gone into the basic study, are reflected in the local estimates. The following comments describe the methodology used in the state study:

> "In mid-1965, the National Commission on Technology, Automation and Economic Progress was assigned the responsibility to identify and describe the impact of technology and economic change on employment likely to occur during the next ten years. The Bureau of Labor Statistics, U.S. Department of Labor, was commissioned to prepare projections of manpower requirements in 1975 by industry and occupation and for certain specified groups

of workers. The Bureau prepared the report, America's Industrial and Occupational Manpower Requirements, 1964-1975, utilizing special research as well as the research conducted as part of other programs of the Bureau of Labor Statistics -- studies of population and labor force, trends in output per man-hour, technological trends in major industries, occupational composition of industry and economic growth.

The industry projections shown in Industry Employment Trends and Projections, Region One, rely heavily on this comprehensive national study; however, regional characteristics and trends are considered also.

In order to make industry employment projections for the region, it was necessary first to have current employment estimates by industry and a series for past years to show trends. These were prepared for the region for purposes of this study. The next step was to compare the local to the national trend in each industry. This was done by computing a series of local to national industry employment ratios and computing the trend of the ratios. These industry ratios were extended to 1975 and when they were applied to the national 1975 industry employment projections yielded local industry projections for that year."

The State projections referred to above are contained in Exhibit D. They extend up to 1975, and project total employment in Region One by the various types of manufacturing and non-manufacturing industry classifications. Michigan City's manufacturing employment compared to the total regional manufacturing employment of 128,400 for 1966 indicates that Michigan City had 7.53 percent of the total regional manu-

facturing employment. An assumption that Michigan City's share of the region's manufacturing employment will remain constant, results in a projected 1975 manufacturing employment of about 11,000. For general planning purposes an extension of this projection beyond 1975 to 1990 was made by this firm based upon the rate of increase projected by the IESD for the 1966 to 1975 period for each type of industrial activity (see Exhibit GG). This methodology results in a projected manufacturing employment of 11,600 by 1980 and 13,000 by 1990. Total employment is projected at 27,000 by 1980 and 35,000 by 1990. These estimates assume that economic growth in Michigan City will be equal to that projected for the Region as a whole, and that the Region itself will sustain a healthy growth past 1975. Being on the outer fringe of the strongest regional growth -- now occurring in Porter County -- it is likely that the Michigan City area will partake of a higher than average share of the Regional growth in future years.

The third method of projection uses the responses from local manufacturers as to employment prospects as a major input. These estimates of growth in existing local industry are supplemented by somewhat speculative estimates of new industrial potentialities. Together these components represent the primary source of "basic employment". "Non-basic" employment in the other industry classifications is then derived on the basis of ratios which currently exist between the two in the region. A modest employment growth rate of one percent annually was used to project employment for both the respondents not projecting their employment and the employment of non-interviewed establishments. As indicated on Exhibit HH, the projection from this method results in projected total employments of 27,100 by 1980 and 32,500 by 1990.

The three projections are summarized in the table below:

Projections of
Total Employment

	1975	1980	1985	1990
Projection 1	27,300	33,400	41,000	50,100
Projection 2	23,900	27,000	30,600	34,900
Projection 3	23,000	27,100	30,900	32,500

Considering the extent to which jobs generate and support population growth, the above estimates substantiate the selection of the population projection midway between the highest two projections of the five that were made in Section 2. In fact, the potential growth of Michigan City which might be anticipated under the conditions assumed in these economic projections closely parallels those projected in Section 2, although Projection 1 is considerably higher.

In the region as a whole, total non-farm employment was 256,300 in 1966 while the total population was 769,900. Therefore, each job supported three residents. In Michigan City itself, the ratio was two residents to each job. This is indicative of the fact that Michigan City serves as an employment base for the surrounding suburbs and rural areas. In fact it seems probable that as much as one out of every three jobs may be filled by a non-resident. Based upon these ratios the total population which could be supported by the projected employment and Michigan City's share of that population are as follows:

Population supportable by Projected Employment

	1980		1990	
	Total Supportable Population	Michigan City's Share	Total Supportable Population	Michigan City's Share
Projection 1	100,200	66,800	150,300	100,200
Projection 2	81,000	54,000	104,700	69,800
Projection 3	81,300	54,200	97,500	65,000

If Michigan City is to grow in accordance with the selected population projections (from Section 2) of 56,700 by 1980 and 76,000 by 1990, it would seem that it may be necessary for Michigan City to retain, as residents, a slightly higher proportion of those employed in the City than they have in the past. Due to aggressive annexation planning which is currently in effect, this may naturally result. The spread in the estimates indicates the potential volatility of the economy and emphasizes the need to be both liberal and flexible in arriving at planning determinations. The realization of the potentials of Michigan City will be dependent in large measure, not only on constructive planning, but on direct progress made in providing a sound and realistic housing program, adequate municipal facilities and a healthy and viable environment.

EXHIBIT FF

PROJECTION 1
MICHIGAN CITY EMPLOYMENT
1970-1990

	1967 Covered Employment	1967[1] Estimated Employment	Average Annual Rate of Increase 1961-1967	Projected Employment 1970	1975	1980	1985	1990
Manufacturing	9,658	10,000	4.7[3]	11,410	14,090	17,400	21,490	26,540
Non-Manufacturing								
Construction	677	740	0.7	760	790	820	860	890
Trans. Comm. & Pub. Util.	252	330	---[4]	330	330	330	330	330
Trade	2,978	3,250	6.0	3,830	4,980	6,470	8,410	10,940
Finance	422	480	4.8	550	680	840	1,050	1,300
Service	963	2,000	1.0	2,060	2,160	2,270	2,380	2,500
Local Government	81	2,200[2]	4.8[5]	2,520	3,120	3,870	4,800	5,950
Other	22	800[2]	4.7[5]	910	1,130	1,390	1,720	2,120
Total Projected Employment	15,050	19,800		22,370	27,280	33,390	41,040	50,570

(1) Based upon IESD estimates of proportion of employees "covered" in each category
(2) Based upon local estimates
(3) Excluding high growth rates between 1961 & 1967 in Transportation Equipment Manufacturing
(4) Decrease of 1961-1967 period is not projected into future
(5) Regional Trends are used since comparable local trends are not available

Map Ref.	Name of Facility	Acreage	Ownership/Use	Service Area	Major Functions or Facilities
	Mullen Playground	3	Public	Neighborhood	Playground, softball, shuffleboard
11	Tall Timbers Park	30	Public	Neighborhood	Basketball, open space
	Rose Street Playground	1	Public	Neighborhood	Playground, basketball
14	Municipal Golf Course	180	Public	County	Golf
	Long Beach Swimming Pool	1	Public	Community	Swimming
8	Pullman Field	8	Public	Community	Playground, basketball, softball, shuffleboard
	Waterworks Playground	2	Public	Neighborhood	Playground, basketball, softball, horseshoes
	Canada Playground	1	Public	Neighborhood	Playground, softball
2	Washington Park	99	Public	Regional	Outdoor theater, playground, picnicking, beach, swimming, marina
2	Washington Park Zoo	30	Public	Regional	Zoo
6	Hausen Park	15	Public	Community	Waterfront, playground, basketball, softball, ice skating
7	Memorial Forest Preserve	25	Public	Community	Picnicking, nature study
	Ridgeland Playground	1	Public	Neighborhood	Playground, basketball
5	Gardena St. Playground	15	Public	Community	Picnicking, playground, tennis, basketball, football, baseball, softball
4	Ames Field	10	Public	Community	Picnicking, playground, outdoor theater, basketball, baseball, ice skating

EXHIBIT GG

PROJECTION 2
MICHIGAN CITY EMPLOYMENT
1970-1990

	1967 Covered Employment	1967[1] Estimated Employment	Annual Rate of Growth Projected for Region[2]	Projected Employment 1970	1975	1980	1985	1990
Manufacturing	9,658	10,000	1.2	10,360	10,980	11,640	12,340	13,080
Non-Manufacturing								
Contract Construction	677	740	4.7	840	1,040	1,280	1,580	1,950
Trans. Comm. & Pub. Util.	252	330	1.7	350	380	410	440	480
Trade	2,978	3,250	2.9	3,530	4,045	4,630	5,300	6,070
Finance	422	480	2.2	510	570	630	700	770
Service	963	2,000	3.4	2,200	2,580	3,020	3,530	4,130
Local Government	81	2,200	4.8	2,520	3,120	3,870	4,800	5,950
Other	22	800	5.6	930	1,190	1,530	1,950	2,500
Total	15,050	19,800		21,240	23,900	27,010	30,640	34,930

(1) Based upon IESD estimates of proportion of employees "covered" in each category
(2) Based upon IESD projected rates of growth for region between 1966 and 1975

EXHIBIT HH

PROJECTION 3
MICHIGAN CITY EMPLOYMENT
1975-1990

	1968	1975	1980	1985	1990
Existing Manufacturing Industry					
Respondents projecting employment to 1980	3,940[1]	5,413[1]	6,720[1]	7,760	8,965
Respondents not projecting employment	2,545[1]	2,723	2,859	3,002	3,152
Non-Interviewed manufacturing employment	3,173[2]	2,905	3,050	3,202	3,362
Total	9,658[2]	11,041	12,579	13,964	14,274
New Manufacturing	-----	500	1,000	1,500	2,000
Total Manufacturing	9,658	11,541	13,579	15,464	16,274
Estimated Ratio of Non-Manufacturing to Manufacturing Employment	-----	.996[3]	.996	.996	.996
Non-Manufacturing Employment	-----	11,500	13,500	15,400	16,200
Total Projected Employment	-----	23,000	27,100	30,900	32,500

1 Source: Industrial Survey, CGA

2 Source: IESD

3 Source: Based upon current regional characteristics which are somewhat higher than those for Michigan City in 1967

Other Figures: Estimated by CGA

HISTORIC STRUCTURES AND SITES
Michigan City Area, 1976

National Register Properties

Old Lighthouse Museum, built 1858, at the bend of the harbor.

Michigan Centeral RR Engine Repair Shop (Tonn & Blank Bldg.) Franklin St. & and harbor. Built 1850-1851.

Barker Mansion, completed 1905, 631 Washington St.

Application pending -
The Old Bank Stand, built 1911, Washington Park. In process of restoration.

Structures and Sites of Local Historic Interest

John Barker House, built prior to 1844; originally at 526 Franklin St. now located at the NE corner of Maple & Belden Sts. Original owner arrived in Michigan City in 1836. Only the central portion remains.

Mullen Hospital, built ca. 1870 as private residence. Used as hospital. Located at 409 Washington St.

Porter-Kerrigan House - circa 1895, located at NW corner of 10th & Washington St. Built by Porter, industrialist and purchased by John Kerrigan, M. D., a prominant local physician and surgeon. Neo-Jacobean strongly influenced by Romanesque.

Krueger-Gardner House, 1520 E. 8th St. Near the site of the former Scott's Mill. Former home of the Hon. M. T. Krueger, mayor of Michigan City from 1889-94; 1898-04. Krueger was responsible for legislation for the creation and establishment of Washington Park on the lake shore. Donor of Memorial Park, a natural wooded area, incorporating two historic sites which are listed following.

The Brewery - 600 E. 9th St. The former Philip Zorn Brewery built in the latter part of the 19th century. After Prohibition, its activity was short lived. The building has been restructured as an office building.

Hutchinson House - circa 1870, 220 W. 10th St. A Neo-Jacobean House built by W. B. Hutchinson, mayor, state senator and founder of the Citizens Bank.

Structures and Sites of Local Historic Interest (continued)

Heritage Square - SW corner 9th and Franklin Streets, the former St. Johns Evangelical Lutheran Church, built 1867. Church has been converted to a theatre. The building to the west, the old German school, converted to a restaurant. The parsonage is attached to the main building.

St. Mary's Roman Catholic Church, built 1867, 10th & Buffalo Sts.

St. Paul Lutheran Church, built 1876, 818 Franklin Square.

International Friendship Gardens, adjacent to Memorial Park, previously mentioned. Removed from the 1933 Century of Progress Exposition.

Marquette Spring, Memorial Park, site of Pere Marquettes visit to this area in 1675. An historic marker is at the site.

Battle of Trail Creek, Memorial Park, Revolutionary War battle fought in 1780. Historic marker to be erected.

Grave of Abijah Bigelow, veteran of the Revolutionary War, buried Greenwood Cemetery, died 1848, age 92.

Grave of Samuel Miller, first citizen of Michigan City, died 1844.

Marker designating the end of the Michigan Road, Michigan and Washington Sts. The city block bounded by Michigan, Washington, Franklin and 4th Sts. was designated as the public square and market by Isaac C. Elston, founder of Michigan City.

Marker designating the site of the visit of the Lincoln Funeral train to be located at the site of the original Michigan Central RR Depot immediate west of Franklin St. To be erected soon.

SOURCE: Michigan City Historical Society

INVENTORY OF RECREATIONAL FACILITIES IN CZM STUDY AREA

COUNTY: LA PORTE TOWNSHIP: CENTER

Map Ref.	Name of Facility	Acreage	Ownership/Use	Service Area	Major Functions or Facilities
27	Cutty's Campground	128	Private/Public	Regional	Fishing, swimming, picnicking, playground, camping, trails
28	Cha-Mar Hills Golf Course	115	Private/Public	County	Golf
	P&D Boat Mart	1	Private	Regional	Water skiing, fishing, marina
	LaPorte Yacht Club	1	Private	Community	Marina, fishing, water skiing
26	Elk Country Club Golf Course	180	Private/Public	County	Golf
	Allis-Chalmers Ball Field	3	Public	Community	Softball
	LaPorte Civic Center	1	Public	Community	Tennis, playground
	Soldiers Memorial Park	380	Public	Regional	Fishing, marina, swimming, picnicking, playground, camping, ice skating, softball, baseball
	East Side Park	3	Public	Neighborhood	Picnicking, playground, softball
	Ben Rees Park	2	Public	Neighborhood	Playground, basketball
	Komler Park	3	Public	Neighborhood	Playground, basketball
	Rumley Park	4	Public	Neighborhood	Playground, basketball
	Waverly Beach	4	Public	Regional	Water skiing, swimming, marina, picnic
	Scott Field	4	Public	Community	Picnicking, playground, softball
	Fox Memorial Park	48	Public	Community	Ice skating, horseshoes, softball, picnicking, marina
	City Park	9	Public	Neighborhood	Horseshoes, softball, playground, picnicking

INVENTORY OF RECREATIONAL FACILITIES IN CZM STUDY AREA

COUNTY: LA PORTE TOWNSHIP: COOLSPRING

Map Ref.	Name of Facility	Acreage	Ownership/Use	Service Area	Major Functions or Facilities
21	Michigan City KOA	40	Private/Public	Regional	Swimming, picnicking, playground, camping, trails
19	Jacks Putt & Sock	10	Private/Public	County	Golf & baseball
25	Ski Valley, Inc.	12	Private/Public	Regional	Ski Slopes
	Rainbows Unlimited	11	Private	County	Fishing, picnicking
20	Michigan City Hunting Club	270	Private/Public	County	Hunting
	Beech St. Playground	4	Private	Neighborhood	Softball, playground
	Nelson Park Trail Creek	5	Public	Community	Playground, basketball, softball
24	Motts Woods	20	Public	County	Playground, basketball, softball, horseshoes
	Southgate Playground	5	Public	Neighborhood	Playground, basketball
	Beech Street Playground	3	Public	Neighborhood	Playground
18	Baker Road Forest Preserve	35	Private/Public	County	Open Space
22	Pottawatomie Council BSA	163	Private/Public	Regional	Camping
23	Pinhook Bog	9	Public	Regional	Open Space
	Golf Driving Range	3	Private/Public	Community	Golf & driving range

INVENTORY OF RECREATIONAL FACILITIES IN CZM STUDY AREA

COUNTY: LA PORTE TOWNSHIP: MICHIGAN

Map Ref.	Name of Facility	Acreage	Ownership/Use	Service Area	Major Functions or Facilities
	MICHIGAN				
	B&E Boat Company	1	Private/Public	Community	Marina
8	Friendship International Gardens	50	Private/Public	Regional	Outdoor theater, gardens
	Michigan City Marina	3	Private/Public	Regional	Fishing, marina
	Michiana Riding Stables	4	Private/Public	Regional	Riding stables
	George Boat Co.	1	Private/Public	Community	Marina
10	Pottawatomie Country Club	130	Private/Public	County	Golf, swimming
13	Michigan City Fish & Game Club	30	Private/Public	Community	Picnicking, water skiing, ice skating
9	Long Beach Golf Course	160	Private/Public	County	Golf
	Pilliard Skating Rink	1	Private/Public	Neighborhood	Ice skating
12	Sullair Corp. Park	50	Private/Public	County	Swimming, open space
	Pullman Playground	2	Private	Neighborhood	Playground
	Dunes National Lakeshore	Pt. 296	Public	Regional	Open space, beach
	Zillo Square Playground	3	Public	Neighborhood	Playground, basketball, softball, horseshoes
	Franklin Square Park	4	Public	County	Open space

MICHIGAN (Continued)

Map Ref.	Name of Facility	Acreage	Ownership/Use	Service Area	Major Functions or Facilities
	Chicago St. Playground	1	Public	Neighborhood	Playground
	Cleveland Playground	5	Public	Neighborhood	Baseball, basketball, playground
	8th Street Playground	1	Public	Neighborhood	Softball, playground
	Oakhills Playground	1	Public	Neighborhood	Playground, softball
1	West Beach	52	Public	Regional	Beach, swimming, playground

INVENTORY OF RECREATIONAL FACILITIES IN CZM STUDY AREA

COUNTY: LA PORTE TOWNSHIP: SPRINGFIELD

Map Ref.	Name of Facility	Acreage	Ownership/Use	Service Area	Major Functions or Facilities
15	LaPorte Fish Hatchery	9	Private/Public	County	Horseshoes, playground, picnicking
17	Michigan City Rifle Club	22	Private/Public	Regional	Rifle range
16	Wildwood Park	53	Private/Public	County	Picnicking, playground, rifle range
29	Lucky Stables	60	Private/Public	Regional	Horse trails, riding, stables